University News

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Indian Science
— Pitfalls, Excellence and Accountability

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— Convocation Address

Bhatnagar Awards 1994
Accreditation and Assessment Council
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Mathematica ®

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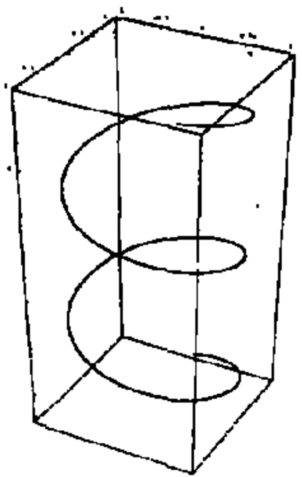

Parametric function Plot

Functions : Numerical, Symbolic, Graphical computation. Interactive programming. Integrated technical computing environment.

Numerical Computations : Arbitrary precision arithmetic, Complex numbers, Special functions (hypergeometric, electric, etc), Combinatorial and Integer functions. Matrix operations, Root finding, Function fitting. Fourier Transforms. Numerical Integration, Minimisation. Linear programming.

```
In [ 1 ] : = 3 ^ 50
Out [ 1 ] = 717897987691852588770249

In [ 2 ] : N [ ( 2 - 3I ) ] / (2 + 3I ) ]
Out [ 2 ] = - 0.384615 - 0.923077I

In [ 3 ] : Find Root [ BesselJ [ 0,x ],{x,14.5 }]
Out [ 3 ] = { x - > 14.9309 }
```

Numerical Computation

Symbolic Computation : Equation Solving, Symbolic Integration, Differentiation. Power Series, Limits Algebraic operations, Polynomial Expansions. Factorisation, Simplification. Operation on Matrices, Tensors, Lists.

```
In [ 1 ] : = Integrate [ x / ( a + Exp [ x ] ), x ]

          x²      x  Log [ 1 + E ˣ ] PolyLog [ 2, - E ˣ ]
                         ───                   ───
                          a                     a
Out [ 1 ] = ──── - ─────────────── - ────────────────────
          2a             a                    a
```

Symbolic Computation

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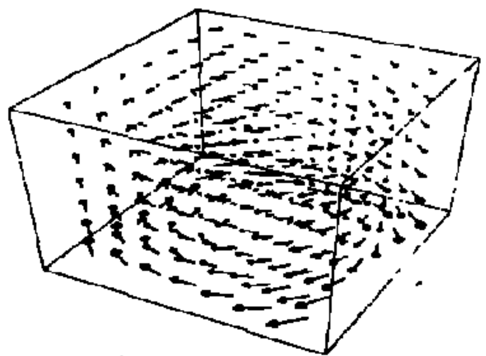

3D vector plot

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In [ 1 ] : = << Graphics `SurfaceOfRevolution`
In [ 2 ] : = SurfaceOfRevoluton [ Sin [ x ],
            { x, 0, 2Pi } ]
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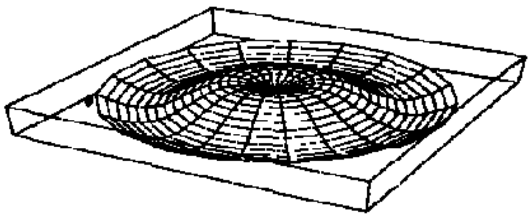
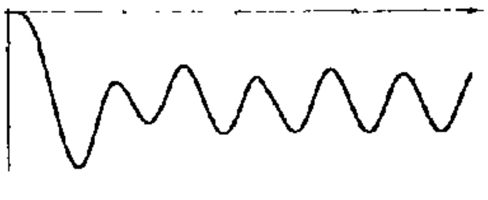


Revolving the Sine Function



Solution plot of 2nd order ODE

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- **Visualisation**
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Editor :
SUTINDER SINGH

INDIAN SCIENCE
Pitfalls, Excellence and Accountability

S.B. Lall*

The tremendous surge in the number of young men and women seeking higher education with Science as the mainstream of learning, research, and activities had led to a deluge of new universities, colleges, national laboratories and private research facilities. At present there are over 200 recognised universities, 7000 colleges catering to the needs of about 54 lakh students. The number of students seeking enrolment is projected to be about 74 lakhs in 2000 A.D. and touch the astronomical figure of 134 lakhs in the year 2020 A.D.

Against this backdrop of massive increase in the population of university students lies the present scenario of chaos, confusion, challenges, opportunities or a state of utter helplessness and psyche of surrender! Science education in Indian universities was never in such a horrid mess as it is today. Except for certain centers of excellence like the IITs, IIMs, Institute of Science, there is practically nothing that the Indian Science can feel proud of. A comparison with USA has very telling and demoralising effect. Seven out of nine Nobel Prizes in Science have been won this year by American scientists. This international recognition in scientific research is way beyond the imagination and conceptual framework of planners at various levels in India.

The scientific efforts are in a state of turmoil in Indian universities. Hackneyed planning, political interference, lack of finances, suppression of talents and creative ideas, growing criminalisation and total disregard for excellence are the pivotal problems affecting Indian Science. Added to this are the monsters of regionalism, casteism, groupism and nefarious politicking.

Despite the fact that there is no shortage of talent and human resources and the country seems to be poised for big breakthroughs in science, something in the system prevents this from happening. How do we harness the creative brains of the country to solve the enormous problems that glare at us? The present trend is that every year a large number of our very best brains leave the country in search of positions in the Western World — recognition of talent, generous funding support, high quality of life and a highly competitive milieu. Indian scientists in North America and Europe have made their mark. It is a matter for introspection why the same people were denied the opportunities. We must also ask — Does this country produce scientists, engineers, doctors and other technocrats as 'Export item' to earn foreign exchange which they repatriate to their families in India? Are we then to compromise with mediocrity and adapt to a sub-standard way of doing things?

What is wrong with Indian Science in the universities which are to do basic research of applied value; disseminate scientific information to farmers, policy planners, politicians and educationists. Why don't universities serve as 'Think Tank' for the society and the nation?

After 1960 the premier universities of the country have begun to get into a state of decay. Instead of being leaders for smaller universities

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that came up in large numbers, these universities practically failed to serve as models for them. A surge of faculty and student unrest, rampant indiscipline, disappearance of 'work culture' growing interference of politicians, criminalisation of body politic, suppression of creative talents and their substitution by incompetent 'our men' led to what now appears to be incurable illness. Total inertia enveloped universities. Appointment of Vice Chancellors on political consideration or their removal because they refused to be bullied by the political party in power resulted in chain reaction of chaos. Instead of planning for the growth and development of the university on a futuristic basis, the vice chancellors reduced themselves to playing the games of balancing equation in making appointments on the basis of power blocks, political and narrow considerations sacrificing merit and excellence. This had sent wrong signals that required the scientists to toe the line of power blocks, power brokers and politicians.

The vertical administration in the universities does not permit authentic researchers and teachers to give their very best. The peculiar situation is that universities are unable to utilise their own human resources and facilities. Under the prevailing conditions the option for a scientist is either to rot with the system or leave! The famous Parkinson's Law is in full operation so that people are competing for incompetence. The channels in the university for a active researcher are too tortuous and frustrating. Research through 'proper channel' has become the real stumbling block.

Universities are failing in their basic role as centres of teaching, research and extension services. The grave national problems of population, environment, health, hygiene, poverty and balanced growth need the attention of scientists in Indian universities. These are national priorities. Formulation of syllabi, research efforts, extension services need to be geared up. We still have rotten syllabi, archaic teaching methods and there is very little that the universities do with regard to extension services.

UGC stipulates that there should be atleast 180-200 teaching days. The scenario in North Indian universities is that not even 50% of this is realised. Student indiscipline, apathy of faculty members, inert administration trying to survive on day to day basis have compounded the problems. Crores of rupees invested in purchasing sophisticated equipment remain unused in the universities. This is because those who can use it are denied access due to inbuilt rivalries. Universities have become the 'junkyard (=graveyard) of expensive scientific equipment.'

Scientific research in universities cannot be geared up unless the menace of red tapism, lack of infrastructural support and the deteriorating academic atmosphere is repaired. The element of motivation and a sense of dedication seems to have disappeared from the system. Its place has been taken by sycophancy, mediocrity and other petty considerations: One wonders why only select band of persons find their entry in all national committees, funding agencies and other statutory bodies. This has been going on for years. Is the country short of experts?

Thus, although the situation of scientific research in Indian universities looks very grim and precarious, it has to be conceded that there are small pockets of excellent researchers, and efficient teachers. They need protection, encouragement by being given due recognition. The 'tribe' of such people must not only be allowed to thrive but increase in number.

Excellence in science in Indian universities will come only when we recognise talent, support them generously with funds and facilities. A stringent criteria of admission, creation of centers of excellence around distinguished scientists will help in this process. Funding patterns have to be changed. Instead of providing yearly 'doles' (much of it is wasted anyway), it will be better if the grants are project based and relate to national priorities.

There is an urgent need to evolve programmes that constantly update scientific talent. Regional diversities in India provide excellent opportunities to prepare scientific programmes that can solve the problem of the state and the region.

Universities must address themselves to the challenges that are overwhelming the society. Job-oriented courses preparating students for self employment would be one step to make universities and colleges socially accountablee, e.g., biotechnology, fish and poultry breeding, industrial chemistry, fashion technology, textile designing, plastic technology etc. The concept of accountability has to be applied to all the sections of the society and not to the scientists alone. This has yet to take root in India. It will perhaps be the duty of the scientists to educate the politicians about the real problems and the mechanisms that may be used to solve them. After all in a democracy nothing can succeed unless there is a political will to do so.

Quality Improvement in Educational Research
Some Reflections

Swarnalata Das*

As an intellectual pursuit, educational research is more suited to the multidisciplinary approach. Unlike other disciplines, education extends easy access to students from other branches. Naturally, it stands for a very extensive, comprehensive arena, while the other side suffers from less solidity. Less solidity is also due to intricacies of various sociological, psychological, philosophical aspects imbibed in the area of educational research. A sound educational research methodology can help in clearing some of the existing problems associated with educational research. On the other hand, it is also instrumental in uplifting the status of research as well as enhancing the quality of it.

To have a better quality research study, some of the pertinent points that the educational researchers should recognise and consider are the following:

The first step is no doubt to develop a right attitude towards research as a whole. This is known to all that increase in supply in any field is also responsible for decreasing quality and standard. More or less that tendency is also applicable in educational research. Due to its very comprehensive nature the faculty of education invites researchers from all disciplines and naturally it will lead to a vast number of research studies in the field of education. It is simply naive to think that all those researchers possess similar attitudes, orientation towards the research process. The fundamental idea behind any research in any field i.e. searching of knowledge, is also evident in educational research. The responsibility of the researcher is therefore to develop intellectual curiosity, academic alertness, sincerity, honesty, and above all, a sense of accountability towards the academic world in general.

The role of the institutions which are funding and providing research facilities should not be passive. In the quality improvement programme they should not shun their respective responsibilities. In fact, it should be a motto of every individual of any research institution to generate, nurture and sustain an atmosphere conducive for research functioning. Equally important is to facilitate the various applications of research findings in its actual field for the greater interests of the society.

The seminal point in improving the standard of educational research is no doubt the proper selection of a research problem. It is not an exaggeration to state that the proper identification and formulation of a research problem is the first bold step for improvement in quality. Although each and every problem on this earth is liable for research from theoretical point of view, one should select only those which are worth probing, feasible for research purpose and socially useful. The researcher should also keep in mind that knowledge generating, knowledge verifying and knowledge adding purpose, common to any research work should also be evident in educational research.

The most obvious lacuna that stands in the process of improving standard is the lack of proper theoretical background supporting the study. It is clearly absent in most of the studies and no attempt is also made to develop any theory out of the study. Generation of theory is intimately connected with discovery and establishment of truth in the vast field of knowledge. Research as an intellectual process is responsible for generating, regenerating or verifying truth for establishment of theory. This is one of the most fundamental ideas inherent in any type of educational research which the researcher should neither ignore nor omit. Some of the problems selected are of a nature which do not necessitate any back up theory. But ultimately combined with some other problems, it will help in developing a theoretical base for some more studies. In that situation, an attempt to develop theory will suffice. Developing a conceptual background for some studies also falls in the same line of developing theory. Another related point is the model developing process. The attempt to develop models through some studies can be considered as pre-requisite for theory developing procedure.

Stress on appropriate sampling procedure is

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another step for improvement of educational research. Although the crux of inferential statistics lies in the very idea of probability sampling, in practice, most of the researchers ignore it. This results in faulty inferences and wrong interpretation of data. Perhaps that is one of the major reasons for which the data collected fail to follow the dictates of the related theory of that particular problem. The types of analyses used by the researchers are also most of the time stereotyped, conventional or simply for the sake of doing it. The educational researchers should always keep in mind that statistical analysis is a means for reaching the end of research and not the end in itself. It is also not to add sophistication or jargon to research. Maximum use of statistical techniques without proper justification is of course an offshoot of increasing use of computer not only in educational research but in all areas. The analysis should be selected as per the type of the problem and not according to the available resources. On the other hand, by simply expressing data in terms of percentage is of no use for verifying or probing any worthwhile issue.

In the area of research tool also the satisfaction lies far from our expectation. A judicious thinking is necessary in selection of any tool in research. The success of any study is ultimately dependent on proper use of tools. A tendency is also observed among the researchers to select any tool preferably of Western origin without considering its adaptability.

Again, if the researcher intends to construct and develop his own tool also, stringent psychomatric norms should be followed. The most widely used tool in the scene of educational research, questionnaire, is of dubious value in most of the cases. Simply by putting some questions together cannot be considered as questionnaire unless it fulfils some necessary conditions. That is why research not only in education but the whole lot of social sciences, suffers one major drawback i.e. problem arising due to social desirability. People tend to respond to the questions asked by researchers in a socially desirable way and naturally the correct responses do not reach the researchers. Due attention should also be given to proper administration of the tool by facilitating the scope for orientation among the respondents. The researcher should try to convince the participants that they are an integral part of the research procedure and the very success of research is ultimately dependent on their honest responses.

The last two aspects are related to the application aspect of educational research. Although a vast number of studies are found covering numerous aspects of the process of education, very few studies really care for its application. In most of the cases research findings are confined only in the pages of journals. The real beneficiaries are not aware of that. Sometimes if the communication is also made, the concerned authority is reluctant to apply or utilise the findings. The result is the increasing gap between theory and practice. At the same time very little concerted effort is observed to integrate the various research findings in the form of meta analysis or in some other way.

The second part of application is near zero tendency of longitudinal study in the area of educational research. Not only that, even the idea of follow up study is very rare. As a result, nothing concrete or authentic emerges in our educational research. This is important considering the future implications of the educational process. If education is considered as an investment in human resources, then simply cross-sectional studies will not help in generating, regenerating new ideas. The investment process is also under continuous supervision which necessitates constant verification of already established facts. To make the educational scenario brighter some such steps are the need of the time, in the context of educational research.

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M.M. Ansari *Rs. 125*

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Economic Liberalization and Higher Education

M.M. Joshi*

India with its vast natural and human resources is now a focus of the developed world for their future potential market or economic activities. The developed countries experiencing stagnation in their economic and industrial growth are looking for new markets in the third world countries. In the last decade or so the concept of global economy has gained tremendous attention of the developed as well as the developing world. The GATT summit held in 1994 sought to intervene in various economic policies of individual states and come out with a universally accepted norm for changing world market into single global market. Different states of world came out with various strategies to fulfil the goals of New Economic Order. There is no way out of the new economic reform movement knocking the doors of every developing country of the world. The changes which are taking place do not find adequate response from our higher education system.

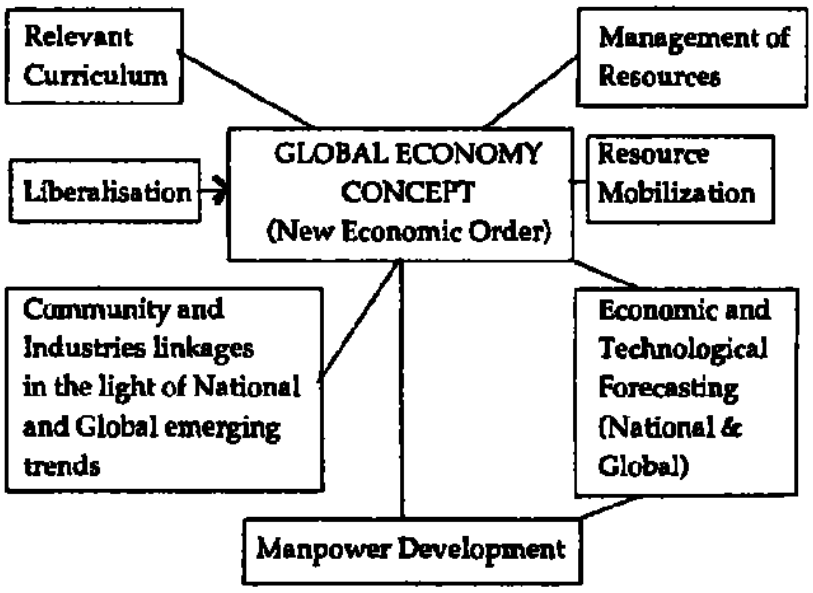
There has been a lot of talk on quality and efficiency of higher education and various types of intervention strategies have been suggested for it through different policy frameworks on higher education. The possible linkages between industries and service sector and institutions of higher learning are also put in as policy measures to exploit fully the human and natural resources for steady growth and development of the country.

But how far we have been able to understand the market forces now operating and their implications for the system of higher education is a moot question. Though it is said that privatization or expansion of private industries is not a new phenomenon in Indian context, the nature of process of privatization in the past and in the recent times is entirely different. In the past the activities of our private industries and foreign multinationals were confined to some selected sectors, whereas after perceiving the effectiveness and efficiency factors and changing global trends, the infrastructural and welfare sectors are also going to come under their sway.

There is no way out of the situation but only equipping ourselves to respond adequately to these issues.

How we should respond to this situation? The responsibility of centres of higher learning is not confined to impart general and technical education but also to forecast the future needs of the economy in the light of changing national and global economic scenario and respond accordingly.

The institutions of higher learning in the times to come will be not in position to sustain financially through govt. grants and other types of donations. They have to stand on their own by mobilizing financial resources from the individuals or industries to which they are going to provide their services. In the light of changing global economic scenario projects should be undertaken on a regular basis to forecast technological and economic needs. Such a strategy will help in developing suitable intervention strategies and actions on the conventional structures and systems. Considering India's share in world trade, which is mere 0.5%, the responsibility of institutions of higher learning in the present economic liberalisation phase is multifaceted. The flow chart given below shows an overview of thrust areas, to be looked into while designing curriculum, teaching-learning strategies, development of manpower etc.


Relevant Curriculum
Management of Resources
Liberalisation
GLOBAL ECONOMY CONCEPT (New Economic Order)
Resource Mobilization
Community and Industries linkages in the light of National and Global emerging trends
Economic and Technological Forecasting (National & Global)
Manpower Development

(Contd. on page 15)

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*Technical Teachers' Training Institute, Shamla Hills, Bhopal-462 002.

TRAINING THINKING

D.R. Goel*
S. Joseph*

Do we have thinking consciousness? What we think, how we think, when we think, how long we think, how efficiently, how timely, how primitively or presently, how centred or wandered, whether valid or invalid, with which inputs, processes and returns we think? To define thinking is very difficult. It is an ever going endless process apparently incapable of direct observation. Thinking occurs in every person but maybe only a few think of thinking.

Thinking is assumed to emerge from other simpler cognitive processes. When an individual deals with the external world he starts thinking. Not only that perceiving and thinking are interrelated processes, but also that emotion, attitude, motivation, learning and other aspects of behaviour enter into thinking. Thought seems to be a course of association. It is the process of establishing association among the attributes of different entities or same entity, forming concepts, equating concepts, assimilating and applying these equations. Thinking is mainly the function of brain. Thinking is considered to mediate the inner activity and the external stimuli. The quality and quantity of thinking may depend upon the relative intensity of the external and internal influences. Thinking is always subject to the properties of the mental organisation of the particular individual who is thinking. It is personalised.

Thinking can occur as a response to an inner need or as a response to a problem arising in the external world. Human beings always think. There is not even a single moment without thinking. I think during sleep also we think, but the quantity is very low. Thinking always occurs in response to some stimulus whether it is directly observable or not. Dreams are a kind of thinking, response to some indirect stimuli.

Many questions emerge in the realm of Thinking — what to think? when to think? how to think? Why to think? How much to think? when not to think? Thinking of a person with eternal empty brain is a futile exercise. Similarly, thinking of a person who has perceived, analysed, classified, conceptualised, and integrated principles and theories governing the universe completely comprehensively and closed his eyes to the world is an extreme expectation.

Man is the most evolved thinking organism yet most sick. Sometimes we think what we should not think, at times we do not think what we should think. If we put a question to someone 'what are you thinking?' very often the answer is 'Nothing'. What is that we like to keep private? Should we think round the clock, round the space? Is there a need to establish stillness '*shunya*' at times, i.e., do the senses, thinking, self-temporal, spatial and logical need rest periodically? Can we attain the climax of consciousness? The focus of the present study is the thinking patterns of human beings.

Rationale

The purpose of education is behaviour modification. In behaviour modification and control the knowledge of thought process is very necessary because the behaviour is the result of thinking process. Without thinking no behaviour will occur. Behaviour may be right or wrong or whatever, it needs some kind of thinking.

Most of the people are over-thinkers, some under-thinkers, whereas a few are optimum thinkers. Some people think at ordinary level, some at extraordinary level. Some have the bad habit of thinking i.e. always think negatively. Some are thinking just opposite of what they really are. These small things, maybe insignificant in themselves, pile up and add burdens to the day to day existence and drain efficiency is unknown to the people.

So the struggle against bad habit of thinking, struggle against false thoughts is very necessary. By developing proper way of thinking we can control and predict the behaviour of an individual. In the educational field such a study about our thinking systems and nature of our thinking which is the most fundamental of human concerns, and yet the most neglected, can contribute a lot.

Institute of Education, Centre of Excellence, Devi Ahilya Vishwavidyalaya, Indore-452 001.

But eliciting the real thinking of people is a very huge task. Usually they hesitate to express their thinking to others because of many reasons. Computer can solve this problem. Computer is a very potent medium for testing the thinking patterns because it has a sense of privacy that can't be realised by interacting with a counsellor. At the same time computers have unique capacity in providing speed, ease and accuracy etc in test administration. More than that the computer itself has taken over the responsibility of administering, scoring, analysing and retrieving the information. So it is very economic, efficient, feasible and time saving medium. Because of all these attributes computer based testing is more reliable and valid.

Such a study is very necessary to help pupil to overcome bad thinking with good and winning the thought process to get happiness, success, peace of mind and self confidence. What to do when the motor muscles work and the mind almost stops? What to do when the mind works and the motor muscles almost rest? Should we act when the thinking is unstable and mind wanders? How much to think when we are in sleep or at rest?

Objectives of the Study

1. To test the thinking patterns of candidates.
2. To treat the candidates situation based wherein they have undesirable thinking.

Tool

The investigator developed a computer based thinking pattern test which is comprised of 19 different areas. The different areas and the number of items against each area are given in Table 1.

Table 1 Thinking patterns and corresponding number of items

Sl. No.	*Thinking pattern*	*No. of items*
1.	Booming - Depressive	4
2.	Pathological - Non-pathological	3
3.	Valid - Invalid	5
4.	Null - Polar	12
5.	Egocentric - Ethnocentric	5
6.	Obsessive - Final	3
7.	Wholistic - Partistic	3
8.	Sensible - Nonsensible	10
9.	Traditional - Humur	8
10.	Optimistic - Pessimistic	10
11.	Straight - Crooked	8
12.	Flexible - Rigid	4
13.	Social - Unsocial	8
14.	Autonomous - Dependent	8
15.	Narrow - Broad	7
16.	Practical - Theoretical	4
17.	Technical - Nontechnical	6
18.	Logical - Nonlogical	8
19.	Imaginative - Nonimaginative	7

Data Collection

Data were collected by administering the thinking pattern test on a B.C.Ed. student (1993-94) of Institute of Education, Devi Ahilya Vishwavidyalaya, Indore. After testing, treatment was given to the client in areas where she had poor thinking.

Data Analysis and Interpretation

The data were analysed in terms of thinking-type classes pooling the responses classwise and overall status of an individual. Also class levelwise weightage was worked out. Depending upon the score obtained the level of the individual was found out. The data analysis and interpretation are presented as follows:

Table 1.1 reveals that out of four situations, in one situation the individual was normal, in one depressive and in two situations booming.

Table 1.1 Normalcy levels and corresponding frequencies

Total	*Booming*	*Normal*	*Depressive*
4	2	1	1

Table 2.1 Normalcy levels, quantification and Individual Status

Normalcy level	*Range*	*Score and status*
Depressive	4 - 6	
Booming	17 - 20	
Average	7 - 16	12 Average

The over all status of the person in booming-depressive class is evident through Table 2.1 which shows that the score obtained by the individual was 12 and it comes under the average category meaning thereby, that the individual is neither depressive nor booming, even though treatment was given to the person against depressive situation. The situation and treatment given are presented as follows:

Situation: You are a good singer. But in the college competition you didn't get first prize because of some biased judges. What will be your state? Answer was 'feel depressed'.

Counsellor (Co) :- Why you feel depressed?

Client (Cl) :- I think I can do nothing in such a situation.

Co:- Why nothing? You should fight for justice.

Cl:- For the judges my performance may not be the best.

Co:- If they were biased?

Cl:- How can I know it?

Co:- If you know it can you fight for justice?

Cl:- Yes, then I can.

Table 1.2 Normalcy levels and Corresponding Frequencies

Total Items	*Pathological*	*Nonpathological*
3	2	1

Table 2.2 Normalcy levels, range and individual status

Normalcy level	*Range*	*Individual status*
Highly pathological	0 - 3	
Pathological	4 - 10	9 - Pathological
Average	11 - 13	
Non pathological	14 - 15	

Table 1.2 shows that out of the three situations in two the individual has pathological thinking and in one nonpathological. The over all status of the person in pathological-nonpathological class is evident through Table 2.2 which indicates that the score obtained by the individual was 9 and it comes under the category pathological. Treatment was given to the person in order to change his pathological thinking. The situation and treatment given are presented as follows :

Situation :- It is 1 a.m. You are walking on barren road. It is dense dark. What do you feel? Response was "think that someone will hit me".

Co:- Why do you think so?

Cl:- Everyday, everywhere that is going on.

Co:- So what? You might have heard of Rani Durgavati, and Rani Laxmibai?

Cl:- Yes, very brave.

Co:- Why don't you be like them? A strong one

Cl:- It is impossible. I am really afraid, even in home also if I am alone.

Co:- What's the need of such a baseless fear? If you are afraid you can carry some armament with you. If anybody comes to you to hit you can also fight. No?

Cl:- Then what will be the result?

Co:- Why you are bothering about result? The result may be death. But don't be a fearful girl. Be bold enough. I think it is meaningless fear.

Cl:- Yes

Situation :- The final exam is about to commence. It is only two days hence. What do you feel? Response was "Think that I have fever."

Co:- Why do you think so?

Cl:- Because of tension.

Co:- What tension? What's the reason?

Cl:- I am always worried about position.

Co:-.Why you are worrying about position? Is it more important than knowledge?

Cl:- No. But how can I face my brothers if I don't get position.

Co:- You have some inferiority complex. No?

Cl:- Yes

Co:- But do you think you can get position through this tension? If you work hard surely you will get position. The tension will reduce your achievement. What do you think?

Cl:- Even though I studied well, sometimes if I miss some questions I am thinking so.

Co:- If you are confident and arrange the time than how will you miss?

Cl:- Yes, That's okay

Co:- So what do you think instead of living in tension what we should do?

Cl:- Should work hard and must be confident.

Co:- Very good. No meaning to think about position.

Mere thinking can do nothing. it will create tension and this tension will decrease the achievement.

Table 1.3 Normalcy levels and corresponding frequencies

No. of items	*Valid*	*Invalid*
5	5	0

Table 1.3 reveals that the individual has valid thinking in all the 5 situations given. The overall status of the person is evident through Table 2.3 in which the individual obtained a score of 5 and comes under the valid category.

Table 2.3 Normalcy levels, range and individual status

Normalcy level	*Range*	*Individual status*
Valid	4 - 5	5, Valid
Average	2 - 3	
Invalid	0 - 1	

Table 1.4 shows that out of the 12 situations the individual was thinking positively in 6 situations, in 2 cases the thinking was negative and in 4 cases neither positive nor negative. i.e. null thinking.

Table 1.4 Normalcy levels and corresponding frequencies

Total No.	*Null*	*Positive*	*Negative*
12	4	6	2

Table 2.4 Normalcy levels, range and individual status

Normalcy level	*Range*	*Individual status*
Positively polar	13 - 24	14, positively polar
Negatively polar	00 - 05	
Null	06 - 12	

The overall status of the individual is evident through Table 2.4 which shows the score obtained was 14 and the individual comes under the category positive polar thinker.

Table 1.5 Normalcy levels and corresponding frequencies

Total No.	*Wholistic*	*Partistic*
3	1	2

Table 2.5 Normalcy levels, range and individual status

Normalcy level	*Range*	*Individual status*
Wholistic	3	
Partistic	0 - 2	1, Partistic

Table 1.5 shows that out of three situations, in 2 the individual has partistic and in 1 situation wholistic thinking. The overall status of the individual is evident through Table 2.5 which shows that the score obtained was 1 and the individual comes under the category partistic.

Treatment was given to make him a wholistic thinker. The situation and treatment given are presented as follows :

Situation:- One girl committed suicide in your village. What will you think? Response: "She might have some personal problems".

Co:- Why you think so?

Cl:- Suiciding is because of personal problems.

Co:- How can you say so? I had a teacher. He was suffering from severe cough. One day he committed suicide. Do you know why? Because he felt that he can't do justice to his students. Is it because of personal problems?

Cl:- That is different. But in the case of girls the reason will be personal.

Co:- See! yesterday only a girl committed suicide in connection with changing the name of Marathwada University. Is it personal?

Cl:- No

Co:- So what do you think?

Cl:- There may be many reasons.

Co:- Yes, that means we can't label it because of the particular reason. we should think of all the possibilities.

Table 1.6 Normalcy levels and corresponding frequencies

No. of items	*Sensible*	*Less sensible*	*Least sensible*	*Non sensible*
10	3	3	3	1

Table 2.6 Normalcy levels, range and individual status

Normalcy level	*Range*	*Individual status*
Sensible	35 - 50	
Less sensible	25 - 34	
Least sensible	15 - 24	24, Least sensible
Non sensible	01 - 14	

Table 1.6 reveals that out of the 10 situations individual was sensible in 3 situations, less sensible in 3, least sensible in 3 and non sensible in one situation. The over all status of the individual is evident through Table 2.6. The individual obtained a score of 24 and it comes under the category least sensible. Treatment was given. The situation and the treatment given are as follows :

Situation:- Do you imagine what to do if something adverse happens, which you never thought of? Response was "always".

Co:- Why you are always thinking so?

Cl:- I don't know. I am thinking a lot. If my Mummy came late from the market, then I start thinking what happened? Accident? and so on...

Co:- Human beings have brain. For what? To think in the right and desirable way. Then why you are thinking always in undesirable way. If accident occurs after that we can meet the situation. So is there any meaning in thinking in such a way?

Cl:- No

Situation:- Whatever jokes your classmates say you feel that it is about you.Response was "Sometimes I feel so".

Co:- Why you feel so?

Cl:- I am thinking that the comments are about me.

Co:- How do you think so?

Cl:- That I don't know. I am guessing so.

Co:- Then why do you bother about others' comments and laughs. They may be talking about some others. No?

Cl:- Maybe

Co:- Unless we are significantly affected we should not worry about others' comments and laughs. You are thinking that you are the target. But actually they may be discussing and laughing at something else. Means you are simply inviting tension because of your bad habit of thinking. No?

Cl:- Yes

Co:- How can you escape from this?

Cl:- Don't give attention.

Co:- Good. Don't think that you are the target of others always.

Situation:- Unfortunately you lost the opportunity to attend one competitive exam. What will you do? Response "Think of it".

Co:- What's the meaning of brooding about the lost opportunity?

Cl:- I am feeling very sorry about that.

Co:- For Example

Cl:- I lost PET. Now also I am thinking about that.

Co:- Through thinking will it come back?

Cl:- No.

Co:- Then why should you think? Is there any use to think about the lost opportunity?

Cl:- No

Co:- What should we do to overcome all these?

Cl:- We should engage in some works.

Co:- What can you do?

Cl:- I can read magazines.

Co:- Dynamic people will think about present and future, not about the past. Past will never come back through thinking. So, we should think and act for present and future. I think so. What do you think?

Cl:- Yes, we should not think about past.

Table 1.7 : Normalcy levels and corresponding frequencies

No. of Items	*Traditional*	*Humur*
8	2	6

Table 2.7 Normalcy levels, range and individual status

Normalcy level	Range	Individual status
Traditional	0 - 2	
Average	3 - 5	
Humur	6 - 8	6, humur

Table 1,7 reveals that out of the 8 situations individual has humur thinking in 6 situations and traditional in 2 situations. Table 2.7 reveals the overall status. The score obtained was 6 and the individual comes under the category humur i.e., the individual thinks according to the context.

Table 1.8 Normalcy levels and corresponding frequencies

No. of Items	Optimistic	Less Optimistic	Least Optimistic	Pessimistic
10	3	1	5	1

Table 2.8 Normalcy levels, Range and individual status

Normalcy level	Range	Individual status
Highly optimistic	40 - 50	
Less Optimistic	30 - 39	36, Less optimistic
Least optimistic	10 - 24	
Pessimistic	00 - 09	

Table 1.8 shows that out of the 10 situations only in 3 situations the individual was highly optimistic whereas in one situation pessimistic, in one situation less optimistic and in 5 situations least optimistic. The overall status of the person is evident through Table 2.8 which shows that the person obtained a score of 36 and comes under the category less optimistic. Treatment was given. The situation and treatment given are as follows :

Situation:- At your leasure time what do you think mostly? Response was "Sorrowful Moments".

Co:- Why you think about sorrowful moments?

Cl:- I don't know but I think.

Co:- Tell me one sorrowful moment you usually think?

Cl:- In 12th class I lost merit.

Co:- What was the reason?

Cl:- I couldn't get much time to study at home because I joined in some outside classes.

Co:- Do you think that your performance might be better than that if you studied at home by utilizing your own abilities.

Cl:- Yes

Co:- See! From this you got a lesson. If you study yourself you can achieve more. Instead of thinking and brooding about the past you should draw some good lessons.

Cl:- Yes That's why I didn't send my brother.

Table 1.9 Normalcy levels and corresponding frequencies

No. of Items	Straight	Crooked
8	7	1

Table 2.9 Normalcy levels, range and individual status

Normalcy level	Range	Individual status
Straight	21 - 30	24, Straight
Average	11 - 20	
Crooked	00 - 10	

Table 1.9 reveals that out of the 8 situations, in 7 situations the individual was a straight thinker and in one situation crooked. The overall status of the individual is evident through Table 2.9. The score obtained was 24 and it comes under the category straight thinker.

Situation:- You are waiting for the bus. An unfamiliar man offeres you a lift. What will you think about it?

Response was "He may have some wrong intentions".

Co:- How can you label him immediately?

Cl:- I can't think he is a nice man, because he is offering lift without asking.

Co:- Why? He might have perceived you as his own daughter. Isn't it?

Cl:- Yes. sometimes.

Co:- You can't label immediately that he had bad intentions. But sometimes may be bad intentions. Be objective in such situations. If you don't like to accept the offer you can thankfully decline it. But no need of thinking that he is a bad man. No?

Cl:- Yes.

Table 1.10 Normalcy levels and corresponding frequencies

No. of Items	*Social*	*Partially social*	*Unsocial*
8	4	3	1

Table 2.10 Normalcy levels, range and individual status

Normalcy level	*Range*	*Individual status*
Highly social	30 - 40	
Partially social	10 - 29	27, Partially social
Unsocial	00 - 09	

Table 1.10 reveals that the individual had fully social thinking in 4 situations, partially social in 3 and unsocial in one situation. The over all status of the individual is shown in Table 2.10. The individual obtained a score of 27 and it comes under the group partially social. Treatment was given to make the individual fully social. The situation and treatment given are as follows :

Situation:- Two persons are fighting on your way to the colleges. What will you do? Response:- "Think what's for me?"

Co: Why do you think so?

Cl- What can I do? How can I know who is right and who is wrong?

Co:- Why don't you go and make an enquiry?

Cl:- Who has time for all these?

Co:- As a human being it is your duty to make them compromise. We should help others and to interact with others and to be social. No?

Cl:- Yes.

Table 1.11 Normalcy levels and corresponding frequencies

No. of items	*Flexible*	*Partially flexible*	*Rigid*
4	1	3	0

Table 2.11 Normalcy levels, range and individual status

Normalcy level	*Range*	*Individual status*
Flexible	13 - 20	14, Flexible
Partially flexible	08 - 12	
Rigid	00 - 07	

Table 1.11 reveals that the individual was partially flexible in 3 situations and flexible in one situation. The over all status of the individual is evident through Table 2.11. The score obtained was 14 and the individual comes under the category flexible thinker.

Table 1.12 Normalcy levels and corresponding frequencies

No. of Items	*Autonomous*	*Dependent*	*Blindly dependent*
8	1	7	0

Table 2.12 Normalcy levels, range and individual status

Normalcy level	*Range*	*Individual status*
Autonomous	30 - 40	19, Dependent
Dependent	10 - 29	
Blindly dependent	00 - 09	

Table 1.12 reveals that out of the 8 situations in seven the individual was dependent and in one autonomous. The overall status of the person in autonomous-dependent class is evident through Table 2.12 which shows that the individual obtained a score of 19 and comes under the dependent category. Treatment was given on the dependent situations. The situation and treatment given are presented as follows:

Situation:- One man is lying unconscious besides the road. What will you do? Response:- Will discuss with friends.

Co:- Why can't you take self decision?

Cl:- Not dare to do alone.

Co:- Do you think always we will get help from others?

Cl:- No.

Situation:- You have no faith in temple and you really don't want to go but your mother compels you to go. What will you do? Response:- Will go.

Situation:- You want to marry a girl/boy with whom you are in love and who belongs to another caste. Everybody is against you. What will you do? Response:- Will try to convince parents.

Co:- Why don't you take your own decision.

Cl:- I can't do anything against my family. Because my family culture is like that. Beyond the words of my parents I can't do anything.

Co:- If you do against them, what will happen?

Cl:- Then I should leave the house.

Co:- You should leave. Do you think that life long your parents will be with you?

Cl:- No but...

Co:- I don't think we should be dependent in each and every case. What do you think?

Cl:- Sometimes we should.

Co:- Yes, sometimes when we are not in a position to take decision alone means some complicated situation may arise then we can ask someone else. But in almost all cases we should be independent and autonomous. No?

Cl:- Yes.

Co:- How do you feel about this discussion?

Cl:- I came to understand my weakness. No I also feel that there is no meaning to think about unnecessary, useless issues. Should be bold, autonomous and should think positively. No use to think about the past, should be aware about the present and future. Shouldn't be sorry about lost opportunities and sorrowful moments, try to draw lessons from experiences. I also feel that instead of wasting time and energy in mere thinking we should work actively.

Table 1.13 Normalcy levels and corresponding frequencies

No. of Items	*Narrow*	*Average*	*Broad*
7	3	2	2

Table 2.13 Normalcy levels, range and individual status

Normalcy level	*Range*	*Individual status*
Broad	30 - 40	
Average	10 - 29	29, Average
Narrow	00 - 09	

Table 1.13 reveals that out of the 7 situations, in 3 situations the individual was a narrow thinker where as in 2 situations average and in 2 broad. The overall status of the individual is evident through Table 2.13 which shows that the individual obtained a score of 29 and comes under the average category.

Table 1.14 Normalcy levels and corresponding frequencies

No. of Items	*Practical*	*Theoretical*
4	4	0

Table 2.14 : Normalcy level, range and individual status

Normalcy level	*Range*	*Individual status*
Practical	3 - 4	4, Practical
Average	1 - 2	
Theoretical	0 - 0	

Table 1.14 reveals that the individual was a practical thinker in all 4 situations given. The overall status of the individual is evident through the Table 2.14. Individual obtained a score of 4 and comes under the category practical thinker.

Table 1.15 Normalcy levels and corresponding. frequencies

No. of items	*Logical*	*Non logical*
8	6	2

Table 2.15 Normalcy level, range and individual status

Normalcy level	*Range*	*Individual status*
Logical	6 - 8	6
Average	3 - 5	
Non logical	0 - 2	

Table 1.15 reveals that in situations out of 8, the individual had logical thinking whereas in 2 situations non-logical thinking. The overall status of the individual is shown in Table 1.15. The individual obtained a score of 6 meaning thereby, that the individual was a logical thinker in almost all situations.

Table 1.16 Normalcy levels and corresponding frequencies

No. of items	Technical	Partially Technical	Non technical
6	2	3	1

Table 2.16 Normalcy levels, range and individual status

Normalcy levels	Range	Individual status
Technical	25 - 30	
Partially technical	12 - 24	20, Partialy Technical
Non technical		

Table 1.16 reveals that the individual was technical in 2 situations, partially technical in 3 and non technical in one situation. The overall status of the individual is evident through Table 2.16 in which the individual obtained a score of 20 and comes under the category partially technical.

Table 1.17 Normalcy levels and corresponding frequencies

No. of items	Imaginative	Less Imaginative	Non Imaginative
7	2	2	3

Table 2.17 Normalcy levels, range and individual status

Normalcy level	Range	Individual status
Highly Imaginative	30 - 25	
Less Imaginative	20 - 29	
Least Imaginative	07 - 19	14, Least imaginative
Non Imaginative	00 - 06	

Table 1.17 reveals that the individual is highly imaginative only in two situations, less imaginative in two situations and non imaginative in 3 situations. The over all status of the individual is evident through the Table 2.17. The individual obtained a score of 14 and it comes under the category least imaginative.

Table 1.18 Normalcy levels and corresponding frequencies

No. of Items	Egocentric	Ethnocentric
5	2	3

Table 2.18 Normalcy levels, range and individual status

Normalcy levels	Range	Individual status
Egocentric	0 - 1	
Average	2 - 3	3, Average
Ethnocentric	4 - 5	

Table 1.18 reveals that out of the 5 situations in 2 situations the individual was egocentric and in 3 ethnocentric. The overall status of the individual is evident through Table 2.18 which shows that the individual obtained a score of 3 and it comes under the category average. i.e., the individual is neither egocentric nor ethnocentric.

Table 1.19 Normalcy levels and corresponding frequencies

No. of Items	Obsessive	Partially Obsessive	Final
3	1	2	

Table 2.19 Normalcy levels, range and individual status

Normalcy levels	Range	Individual status
Obsessive	13 - 15	
Partially obsessive	08 - 12	11, Partially obsessive
Final	03 - 07	

Table 1.19 reveals that the individual was obsessive in 1 situation and partially obsessive in 2 situations. The overall status of the individual is evident through Table 2.19 which shows that the individual obtained a score of 11 and comes under the category partially obsessive.

Result

1. Thinking pattern can change through counselling in a relatively short period of time.
2. Cognitive counselling technique is useful in the acquisition of desirable thinking.

Discussion and Conclusion

From the clinic section it was found that the individual was really a dependent and pathological thinker. The individual was an excessive thinker, about unnecessary events and issues. The counsellor had given a very powerful treatment to make her autonomous and non pathological. After the clinic session the individual herself accepted that there is no need of thinking about unhappened events, and the individual feels that she should be autonomous.

The client agreed that there is no meaning in thinking about the broken record of the past, it will colour the present and the future.

After the clinic session it was found that certain changes occurred in the thinking of the individual. This change may have very short period of existence. But continuous treatment will make changes in the thinking pattern of an individual.

These small things like, thinking about failures, worrying about position, which are insignificant in themselves pile up and add burdens to day to day life. Unless minor disturbances are discovered and remedial measures taken to correct them, they are likely to develop into handicapping disorders. People can be helped to improve their adjustment by better thinking and having a more objective view of life.

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Economic Liberalization and Higher Education

(*Contd. from page 5*)

Overview of Thrust Areas of Intervention

The components operating within the broad system need a closer look on the part of policy makers. Let us consider some operational action stages to be thought of while working on these lines.

1. *Identifying key areas of intervention*

Here the meaning of intervention is not the same as understood in the lines of implementation and measures taken by the government. Intervention here means, "The system of higher education equipping itself for imparting education, and training in the areas which have posed challenges to present system of higher education." The areas are not only confined to science and technological development but to all the challenges posed by national and global market forces.

2. *Planning for future action*

To plan out on the basis of identified components operating in the liberal economic system having direct or indirect implication for achieving the goals of new economic policies, is the major challenge for institutions of higher learning. So it is a stage where there is need to develop operational model suited for implementation in the true sense. The planning for action on the part of institution of higher learning should come after estimating prevailing situation and forecasting of future economic and technological developments.

3. *Implementation of action plan*

It is said that Indians are good in policy making and planning but at implementation level their effectiveness and efficiency get reduced by 50 percent. So at this phase we should channelise all our energies to develop expertise in the implementation of action plan. For this the suggested measure could be small pilot project study areas and after judging their effectiveness the same could be extended to become essential part of the system.

4. *Feedback on action plan*

A regular evaluation of different action steps and their efficiency and effectiveness should be done to improve upon the present situation and apply proper intervention strategies/actions in order to meet the desired outcome of the action. The main emphasis should be on the process of action rather than varying the inputs of the action. Both short and long term feedback mechanisms may be undertaken for experimentation in the initial stages and later on the basis of results, a common strategy could be evolved.

5. *Multiplying the action plan*

The most successful action plan could be multiplied in many other centres taking into consideration the responses of economic system operating at local, national and global levels. So the multiplication of action should be three tier so that it could meet needs of all the three tiers.

Though the above stages are hypothetical in nature, the centres of higher learning may think on these lines to evolve a plan of action through different activities to respond adequately to challenges posed by emerging trends in national and global economy.

Competing in the Global Arena

Dr. Shanker Dayal Sharma, President of India, delivered the Convocation Address at the Indian Institute of Technology, Kharagpur. He said, "The four decades of sustained industrialisation and economic planning have brought our national economy to a point where we have the strength to stand on our own feet. It is now possible for us to deal with other nations on equal terms....The nation today has the capability, talent and confidence to compete in the global arena and we seek to fashion a step by step strategy to achieve our goals in this regard. The policy of economic liberalisation and reform being undertaken thus represents a self acknowledgement of our own maturity. We have economically, industrially and technologically come of age and must not hesitate in accepting this fact. We are ourselves players today and not simply the playing field." Excerpts

Young engineers and technologists of present day must bear in mind that they are heir to a rich tradition of learning from times immemorial. Various excavations have shown that thousands of years ago our ancestors possessed a wide range of technologies from town planning to copper and bronze usage and solid wheeled carts. Our ancestors had the capability to build dockyards as far back as four millenniums ago. Our ancient literature is replete with scientific and technological concepts of a very high degree of sophistication : astronomical theories, natural laws, environmental concerns; the atomic nature of elements and the decimal system are but few of the examples. The mathematical contributions associated with Varahamihira, Aryabhata or Bhaskara Acharya indicate the level of intellectual advancement at their time. The march of history has as its inevitable accompaniment the progress of technology. India made immense contributions in this regard. Our architecture and construction skills were famous, as were other activities impinging on the evolution of civil society. I do not seek to romanticize the past but to recall a legacy which reminds us that knowledge and its application to life have been traditionally viewed as part of a greater totality, and the Indian mind is second to none in the field of science and technology.

It was this intellectual inheritance, so eloquently summed up by the ancient precept "सा विद्या या विमुक्तये" *i.e. 'learning is that which liberates from poverty, ignorance and prejudices'* which the leaders of independent India drew upon when they charted out a national science policy. Panditji, whose role in this regard was critical, envisaged in the establishment of scientific and educational institutions the basis for building a society responsive to the requirements of its people and as providing key instruments for long awaited social changes. In 'The Discovery of India', he saw India as a country *"abundantly supplied with everything that makes a country rich, and yet her people are very poor."* He says, *"India has the resources as well as the intelligence, skill, and capacity to advance rapidly. She has the accumulated cultural and spiritual experience of ages behind her. She can progress both in scientific theory and the applications of science and become a great industrial nation"*. In Panditji's vision, the solution lay in developing our scientific capabilities for *"there is no visible limit to the advance of science, if it is given the chance to advance"*. Our freedom fighters nurtured the vision of leading the nation to the frontiers of science and technology, not only for the sake of knowledge, but also for its larger consequences. This IIT, located at a former detention camp for our freedom fighters, is especially symbolic of their hopes and aspirations for the future.

Science has an ethical and moral basis and is to be evaluated by the criteria of the end which it serves. In India, there is the task of improving the living standard of the vast majority of our countrymen. I am confident that each one of you stepping out of the portals of this great institution would be imbued with the same sense of purpose and mission which led to the establishment of the Institutes of Technology.

Your generation can fortunately take for granted a lot which ours could not. It is with considerable effort and cost that a modern state has been built after emerging from two centuries of colonialism, aggravated by the trauma of the partition of the country. The India we have sought to create is envisaged as a secular nation, based on democratic ideals, committed to social justice and reflecting the harmony and synthesis of its diverse cultures. Parochialism, divisiveness and chauvinism have no place in this vision. Panditji used to refer in this context to the importance of the scientific temper, to a scientific approach to the problems of life. In his address to the Science Congress in Calcutta in 1957, he defined the scientific spirit as "*essentially one of tolerance, one of humility, one of realization that somebody else may also have a bit of the truth*". At a time when the fabric of our society is being stretched by narrowness and intolerance, you have the responsibility of shaping the broader thinking and philosophy which can be the basis of our composite nation.

Each generation of students stepping out into society confront new problems and seek to fashion their own answers. In India, there is no shortage of challenges, be they scientific or philosophical, intellectual or technological. These are shaped as always by the state of the nation, but are increasingly influenced by developments the world over. We have to come to terms with the fact that the rate of technological change in the world today is such that it is no longer possible for any nation to remain isolated behind walls of protectionism, political or economic. Indeed there can be no more apt an illustration than the role of information technologies in heralding the sweeping political changes which took place at the beginning of this decade in Europe. Saying that the world is getting smaller has a real underlying basis to it and is particularly so in your profession. If India is to contribute to and receive the benefit of global technological advances, that will be possible only if our participation in the global economy and technology is vigorous and whole hearted.

A decision on our part to participate more extensively in the global economy is a matter which cannot be approached lightly, affecting as it does the lives and livelihood of millions. We have to honestly assess our strength and weaknesses and accurately define our problems in order to find optimum solutions.The four decades of sustained industrialisation and economic planning have brought our national economy to a point where we have the strength to stand on our own feet. It is now possible for us to deal with other nations on equal terms. We have established basic industries and the necessary infrastructure. We have nurtured our private sector to a degree where it can shoulder a greater share of responsibilities. In foreign trade, we have comparative advantages which can be exploited to the fullest. India has the third largest pool of trained scientific manpower in a world where science and technology have an ever growing influence on daily life. The nation today has the capability, talent and confidence to compete in the global arena and we seek to fashion a step by step strategy to achieve our goals in this regard. The policy of economic liberalisation and reform being undertaken thus represents a self acknowledgement of our own maturity. We have economically, industrially and technologically come of age and must not hesitate in accepting this fact. We are ourselves players today and not simply the playing field. This is the legacy which you have inherited and how best you use it is the challenge before you.

Undoubtedly, in a world of sovereign states and competing interests, true globalisation and equitable sharing of benefits of scientific advances is an ideal. Scientific and technological applications are after all, linked closely to economic and commercial considerations and will naturally be used to the advantage of some and the disadvantage of others. There will also remain security implications of technologies which lead to discrimination in their sharing and proliferation. We have had experience of how in space technology, atomic energy, communication and computer technologies, attempts have been made to erect and perpetuate global technology controls which in effect deny benefits to the majority of nations. Such problems will have to be faced. Therefore, even though we have embarked on a quest for greater economic participation in world affairs, our determination to strengthen our national scientific and technological base remains undiluted. So too does our commitment to resist discriminatory frameworks for technology controls, particularly when they impinge on our national security. Indeed, it is only through building up our national capabilities that India can have an effective voice in the world and help shape a common future which will reflect our ideals and principles.

In our country, the Indian Institutes of Technology should be in the forefront of meeting this challenge of globalisation. Your very motto : योग: कर्मसु कौशलम् — is a commitment to strive with utmost efficiency in pursuit of our national objectives. Each of the Institutes reflects in their own way the benefits of international cooperation in science and technology. They have already established a network of academic contacts and exchanges. Their alumni scattered over different parts of the world, continue to maintain close ties with their parent institutions. In the changed situation, it is imperative that these linkages are strengthened for the Institutes to keep pace with technological developments elsewhere. An era of open economy and greater competition will lead to stricter criteria by which scientific and technological institutes will be evaluated. Their contribution to new knowledge, their ability to innovate and synthesise, and their relevance to important issues of our time, will all determine their reputation. As multidisciplinary institutions, much is expected of the alumni of Indian Institutes of Technology in this regard. They should remember that more than two thousand years ago, our great sage Thiruvalluvar in his world famous immortal classic Thirukural declared —

> *"The great are those who can achieve rare feats. The lesser are those who cannot."*

The bond between research and production is the hallmark of a modern economy and indegenous technological advancements can sharpen our competitive edge. Industry too, should contribute to the development of academic institutions, particularly where funding is concerned. The recent policy which allows a weighted tax deduction of 125% of contributions made to Indian Institutes of Technology, scientific laboratories and universities is a very welcome step. I hope that this would encourage a greater investment in technical education and research in the country.

Excerpts from the Report

by

K.L. Chopra

Director,

Indian Institute of Technology, Kharagpur

Academic Programmes — Future Vision

With major revisions of the curricula the names of the departments of Agricultural Engg, Metallurgical Engg and Naval Architecture and their respective B.Tech. degrees have been changed to Agricultural & Food Engineering, Metallurgical & Materials Engineering, and Ocean Engineering & Naval Architecture.

The first batch of students, all sponsored, commenced their MBM studies in the Vinod Gupta School of Management in August, 1993. The 1993-94 session also saw the first batch of self-financing foreign students enrolled in our teaching programmes. Visiting scholars from Canada, Netherlands and USA enrolled in different semesters on transfer of credit arrangements with their universities. IIT, Kharagpur is offering a new integrated B.Tech/M.Tech programme on Bio-Technology beginning with the 1994 academic session. The emphasis is on applications to chemicals, agriculture and environment. It also proposes to establish a School for Information Technology and a School of Environmental Studies.

Research and Development Activities

The Agricultural & Food Engineering Department has developed a motorised weeder for cleaning small water bodies and water ways. The Architecture & Regional Planning Department is working on rural road networks, low cost technology in housing and metropolitan fringe studies. The Civil Engineering Department has developed an acid proof cement and is diversifying its research activities to elemination of water pollution, biosorption of heavy metals and removal of pesticides by wood charcoal. A novel see-saw effect bioreactor for manelion cell culture has been developed by the Chemical Engineering Department. The Department has also been successful in producing a medical grade light liquid paraffin from raw crude oil. A general method for the electrosynthesis of peroxo complexes by the dissolution of metal anodes has been developed by the Department of Chemistry.

The Geology & Geophysics Department is carrying out studies on clay minerology of argillites, chemical environments of deposition of branded iron formations; amongst its various other research activities. The Mining Engineering Department has designed a dynamometer to simultaneously measure the thrust and torque at the bit-rock interface during rock drilling. The research activities in the Department of Physics & Meteorology centre around experimental and theoretical condensed matter physics, as also on studies of atmospheric boundary layer. In the micro-science laboratory, Scanning Tunneling Microscope has been used to establish field induced surface engineering and creation of nano structures. Nanomaterials technology has been developed for technologically important multicomponent oxides. Research workers in the Materials Science Centre have developed a biodegradable plastic film and have discovered a new ferroelectic semiconductor based on GaTe with a high dielectric constant. The Cryogenic Engineering Centre has made considerable progress in developing close-cycle cryo-refrigerator down to 44K, using indigeneous materials. The work on high Tc superconducting films is now focused on applications for microwave devices. The Rubber Technology Centre has developed new ionic elastomers and electron beam irradiated heat shrinkable tubes for cable insulation.

Research works in the Department of Mechanical Engineering include cogeneration, spray combustion, rotor dynamics and novel manufacturing processes using intelligent machines and laser processing, amongst others. Laser surface engineering for superior corrosion/oxidation resistance is being pursued in the Department of Metallurgical and Materials Engineering in addition to works like production of TiC-reinforced ferrous composites from ilmenite ore. Investigations in the Aero Space Engineering Department focus on composite structures, their impact behaviour, dynamic response and flutter. Works in the Ocean Engineering & Naval Architecture Department continue on finite element analysis of ship structure and hydrodynamics of free surface flows.

The areas of investigation in the Mathematics Department include computational fluid dynamics, image processing, parallel algorithm, data base systems, relativity and astrophysics. The Computer Science and Engineering Department is involved in VLSI circuit design, an expert system for leprosy diagnosis and management. The Department has successfully designed and developed a cellular automata (CA) chip which has been fabricated by ITI Bangalore. A prototype system for teaching braille alphabets to the blinds has been developed jointly with the Electrical Engineering Department. The research workers in the Electronics & Electrical Communication Engineering Department have produced VLSI/ULSI grade ultrathin silica film using microwave plasma. A photonic network simulation software system has been developed by the Department for performance evaluation of optical networks. The research works in the Electrical Engineering Department include design and development of 50 kV, 10 kA impulse current generator, 600 kV high voltage resistive divider, power system stabilisers and the design and development of photonic based sensors. A multi-disciplinary team is working on the development of erbium doped fibre for fibre amplifiers in the Central Research Facility of the Institute.

Sponsored Research, Consultancy and Know-how Transfers

Faculty members of the Institute secured 28 new sponsored projects and over 50 consultancy projects during the financial year 1993-94 at a total cost exceeding Rs. 5 crores.

Some of the major sponsored projects relate to Design and characterization of bi-polar transistors (DOE), Thermo-structural analysis of highly heated advanced composite structures (ARDB), Design and development of computerised Braille library system for the blind (DST); Work of family stress among working women (ICSSR). The Institute has also attracted international funding from the Ford Foundation for a programme on Participatory Forest Management.

One of the major long range consultancy projects is the Invitro production of sandal wood seedlings/plants sponsored by M/s Memorable Industries and Finvest Eyes Ltd, Calcutta. We have already commenced sandal wood plantation in a nearby farm-land admeasuring 150 acres.

Other major consultancy

projects relate to Aluminium factory waste utilisation for agriculture (INDAL); Design of the training centre (TATA Bearings); Simulation of a vector controlled cyclo converter-fed synonymous motor drive (BHEL); Ground water and oil seepage around Barauni refineries site (IOCL); Molten metal logistic and optimal scheduling (Telecom); Yield and quality improvement in medium and light structural mill (TISCO); Thermal hydraulics of helical coolers (Marshall); Experimental studies of ship hydrodynamics (NSTL). The Institute has made available its expertise for the preservation of the stone-structure of the Sri Jagannath Temple, Puri.

The know-how for a unique vessel for plant tissue culture developed by the Chemical Engineering Department has been transferred to M/s Tarson Products, Calcutta. The process know-how in large scale production of plant Lectin is under negotiation for transfer to M/s East India Private Limited, Durgapur.

Jointly with other IITs and IISc, the Institute is working on four Technology Development Mission projects funded by the Planning Commission in the areas: Food Process Engineering, Photonic Devices and Technology, Computer Networking and Intelligent Automation, Biotechnology and Genetic Engineering. The main objective of these missions is to develop commercially viable products, processes, or technologies in collaboration with industry/user agencies. MoUs have been signed in this regard between the Institute and several industries like RDCIS, SAIL, Ranchi; WEBEL, Calcutta..

New Facilities

Central Units

Two DEC Alpha 300 Model 400 AXP Servers based on 64 bit micro-processors have been acquired and installed in the Computer Centre of the Institute. These Servers connected in parallel with the Cyber 180/850 main frame system are being made available to users across the campus through Institute-wide network.

The modernisation and automation programmes for the Central Library are progressing satisfactorily and an MHRD project has been received for facilitating an Electronic Library. The ERNET E-mail service is being utilised to communicate to the Internet and search data bases of a large number of libraries around the world. The new Library Annexe building is expected to be completed in the next few months.

Departmental

The Agricultural Engineering Department has established a laboratory for the testing of farm engines and has installed a new Escort tractor and a Kubota power tiller. The Civil Engineering Department has commissioned a 100 ton Instron universal testing machine. The Geology & Geophysics Department has upgraded its OYO-MCSEIS 160 signal enhancement sysmograph to 24 channel, achieving higher resolutions and penetration depths. The Mechanical Engineering Department has installed a 20-tool CNC machining centre in the Central Training Workshop. The Metallurgical and Materials Engineering Department has acquired a vacuum encapsulation facility with glass/quartz tube. A 40 kW plasma melting furnace has been designed by the Department.

The Mining Engineering Department has procured a large size motorised direct shear box for its Rock Mechanics Laboratory. The Cryogenic Engineering Centre has acquired facilities for research on superconducting infra-red detectors in the 1 to 20 micrometer range. Equipments such as compression stress relaxometer, temperature retraction tester and micro-hardness tester for evaluation of rubber compounds have been installed by the Rubber Technology Centre. An argon ion laser with monochromator for photo-luminiscence studies has been acquired by the Materials Science Centre. Almost all Departments and Centres of the Institute have upgraded and enhanced their computational facilities in terms of new 486 PCs, silicon graphics workstations, compute servers, multimedia devices, including image and voice processing and associated softwares.

Continuing Education Programme

During the year, over 60 programmes were conducted for more than 1500 participants. An MoU has been signed with the Educational Consultants of India Limited for help attracting foreign students to our regular as also CEP programmes. In another significant development, the course on Engineering for Rice Agriculture conducted by the International Rice Research Institute, Manila, Philippines is being proposed to be transferred to this Institute. This course is meant for participants from South East Asian countries.

During 1993-94, 14 sponsored teachers completed their Ph.D programmes and 15 did their Masters. The new enrolment for the sponsored teachers are 16 for the Ph.D and 19 for the M.Tech curricula. Seven Summer and Winter Schools were conducted under the QIP and ISTE schemes.

Nehru Museum

Established on the occasion of the birth centenary of Jawaharlal Nehru in 1989 the Museum conducted its fourth annual model competition on 12th March, 1994. Three thematic science exhibitions were organised during the year. Two important exhibits added to the Museum are a narrow gauge locomotive donated by the railways and a volume hologram of Dinosaurs. Three booklets entitled: "*Laser-The Light Wave of the Future,*" "*Food n' Fun*", and "*Brain Wave*" have been published by the Museum. The Museum is developing an archival section on the historical evolution of IIT Kharagpur.

Seminars, Conferences and Workshop

The Departments of Aerospace and Mechanical Engineering organised a short-term course on Liquid fuel atomisation and combustion modelling. An international conference on Combined cycle power generation and an associated short course were organised in Calcutta jointly by the Departments of Chemical and Mechanical Engineering. The Mechanical Engineering Department also conducted a national conference on Machines and Mechanisms. The Computer Science & Engineering Department organised a national seminar on Theoretical computer science. The CSE, ECE and Electrical Engineering Departments jointly conducted a course on Micro-processor systems and applications for Railway officers. The Humanities & Social Science Department conducted two workshops on Corporate communications. The Metallurgical & Materials Engineering Department organised a seminar on Future metallurgical education in India. A national seminar on Materials science education was conducted by the Materials Science Centre. The Rural Development Centre organised a workshop on Role of NGOs in rural development. The Computer Centre is conducting short term courses on several aspects of computer applications for ministerial and technical staff of the Institute.

The year 1994 happens to be the birth centenary year of four distinguished scientists of the country: Sir J C Ghosh, our first Director, Professor Meghnad Saha, Professor P C Mahalanobis and Professor S N Bose. The Institute befittingly conducted several seminars, sometimes jointly with the Science Association of Bengal, to commemorate these scientists. Over 100 faculty members presented research papers, chaired technical sessions and delivered key-note lectures in various national and international seminars/conferences held in India and abroad.

International Collaboration

A memorandum of understanding has been signed between the International Foundation for Water Science and Technology (IFFWSAT) of Abu Dhabi and IIT, Kharagpur for technical collaboration in fields of mutual interest such as desalition technology mission, research and development in modelling simulation, identification and control of MSF processes and sponsored projects in different disciplines. As a token of goodwill and pleasure in signing the agreement, the IFFWSAT Director General has offered computer hardware worth about Rs 50 lakhs to the Institute.

IIT-TUNS, Canada collaborative research programme is under continuation in the Departments of Chemical and Mechanical Engineering. Indo-US collaborative research programmes are being carried out in the Mechanical and E & ECE Departments.

Technology Foundation

Our decision a year ago to establish the Technology Foundation, primarily for better contacts with industry through our alumni, is bearing excellent results. A computerised data-base of our alumni all over the world is under preparation. The donations received this year from alumni exceed Rs. 8 lakhs. The Foundation has also started attracting consultancy projects.

Another innovative concept introduced by the Institute allow faculty members to set up small scale enterprises on the basis of the R&D work being carried in the Institute. At present 28 faculty entrepreneurs comprising 11 companies have registered with the Technology Foundation. Some of these entrepreneurs have already received significant assignments from defence and other governmental as well as private agencies. Thus, besides generating jobs for the local youth, a real environment with hands-on experience for the faculty and students is being ushered in.

Student Activities

Our students participated in the Inter-engineering institutes cricket tournament. Mr G Gourishankar bagged both singles and doubles championship in the District tennis tournament Mr Mohan Jyoti Dutta received a special commendation certificate as the best speaker in the Indira Gandhi memorial debate competition organised by the Indian Council of World Affairs, New Delhi. Mr Sameer K Mandal was awarded the prestigious Vandai Cup and Mr R Ahmed Khan received the Chandiramani Cup.

Student Volunteers of the NSS Unit, during their winter camp in the Jhargram block, participated in improvement of rural roads, social forestry, cleaning of school compounds, post-literacy programmes and the like. The NSS Unit organised a one-day Workshop on awareness against HIV (AIDS) jointly with the Jay Prakash Institute of Social Welfare, Calcutta. The NCC Unit of the Institute received the Sikha Dutta memorial trophy in recognition of the blood donation by our student cadets.

NATIONAL INSTITUTE OF DESIGN
AHMEDABAD 380 007

ADMISSIONS 1995-96

NID is India's premier institution for design training, design application and design awareness. Established in 1961, it has received national and international recognition for the quality of its education and service, and of its graduates. Today they find rewarding careers in industry, development organisations, education and as independent practitioners NID is an autonomous national institution set up by the Ministry of Industry, Government of India

SCHOOL LEAVERS' PROFESSIONAL EDUCATION PROGRAMME
This 5-year programme offers Diploma Courses in **Industrial Design** (Textile Design, Product Design, Furniture Design, Ceramic Design) and **Communication Design** (Graphic Design, Animation Design and Video Programming). Admission is open to students who have passed or who will appear in 1995 for qualifying examinations under Higher Secondary or its equivalent. Competence in mathematics, science, social studies, drawing, technical and related subjects will be an advantage The medium of instruction is English Admission tests for eligible candidates will be held at **Ahmedabad, Calcutta, Bombay, Madras and New Delhi in the second week of January 1995.** Candidates selected from these admission tests will be interviewed in April/May 1995 at Ahmedabad
A limited number of need-cum-merit freeships are available NID also facilitates Higher Education Loans from HDFC. These loans, with an upper limit of 90% of the total expenditure to be incurred by students on their education at NID, are repayable by recipients on completion of their studies at the Institute

For application forms and further details please send a Demand Draft on any Scheduled Bank at Ahmedabad for Rs 150 (only Rs 50 for SC/ST candidates) payable to the Secretary, NID, and a self-addressed envelope (25cm x 12cm) with Rs 2 stamps affixed Mark your envelope '**Admissions**'. Completed application forms must reach **NID** by
25 November 1994.

Fifteen per cent and seven-and-a-half per cent of the seats are reserved for candidates belonging to SCs and STs respectively who qualify for admission as above. Their round-trip 2nd class train fare from place of residence to tests/interviews will be reimbursable for the first appearance

NATIONAL INSTITUTE OF DESIGN PALDI AHMEDABAD 380 007

TO OUR READERS

Knowledgeable and perceptive as they are, our contributors must not necessarily be allowed to have the last word. It is for you, the readers, to join issues with them. Our columns are as much open to you as to our contributors. Your communications should, however, be brief and to the point.

CAMPUS NEWS

New Method of Extraction from Rock Phosphates

The scientists of Calcutta University are reported to have discovered a new method for extracting phosphorous pentoxide from huge deposits of rock phosphates near the Ayodhya hills of Purulia district. Phosphorous pentoxide is one of the main ingredients required for manufacturing phosphoric acid which is used for making high-grade fertilisers as well as phosphate chemicals.

According to the scientists, the discovery a "boon" for the country's economy. With the application of the new method the country will become self-sufficient in phosphorous pentoxide and it would no longer require to purchase it from abroad.

The new discovery is important because though there are huge deposits of rock phosphates containing phosphorous pentoxide in many parts of the country apart from Purulia, the rocks were of no use in the absence of any low cost technology for extracting the phosphorous pentoxide from the rocks.

Dr. A. Banik of the Chemical Engineering Department of the University said that to manufacture phosphoric acid, pure form of phosphorus pentoxide, free of iron and silica, is required.

The rock phosphate deposits of Purulia contains 42 to 46 per cent phosphorous pentoxide, 0.2 to 0.8 iron impurities and 0.2 to 0.3 per cent silica.

He said conducting tests on the Purulia rocks, the scientists had been able to free the iron and silica impurities from it through a biological process. A particular type of fungus "Aspergillus Niga" was used for the purpose.

Dr Banik said the fungus was collected in its natural form from the soils of Moinaguri in North Bengal. He said the genetic pattern of the fungus was then changed in the laboratory.

Later, the fungus was injected into the powdered sample of the rock. After nine days fermentation it was found that more than 80 per cent iron and 100 per cent silica were freed from the sample.

New Technology for Fluid Extraction

A technology package is reported to have been developed by the Centre for Rural Development and Technology (CRDT), IIT, Delhi which would substantially cut down the cost of production in a host of industries like perfumery, petro chemicals, agrochemicals, soft drinks, vegetables oils, species, food, natural insecticides and pharmaceuticals.

The new technology is a supercritical fluid extraction system which is much superior to traditional methods used for extraction of oils from sandalwood, ginger, costus, clove and cumin, removing organic pollutants from waste water, separating pesticide from essential oils and food products, separating aromatisomers from mixtures and low molecular weight materials from polymer and light component from coal.

What was most significant about the technology, according to Prof R C Maheshwari and Dr S N Naik of the CRDT is that it was environmentally friendly, offered higher yield, very pure essential components, excellent to thermally labile substance/aromas, energy efficient, free from toxicity and free from toxic solvent traces. They said this technology would prove to be a boon for export oriented industries like spice, oleoresins, essential oils, herbal extracts, phytochemicals and natural pesticides.

Bhatnagar Awards 1994

Eleven scientists received the prestigious Shanti Swarup Bhatnagar awards for the year 1994 for their outstanding contributions in the field of science and technology.

The awardees are: Dr Alok Bhattacharya, JNU, New Delhi and Dr R.Nagaraj, Centre for Cellular and Molecular Biology, Hyderabad; (Biological Sciences); Dr E. D. Jemmis, University of Hyderabad, Hyderabad and Dr D. D. Sharma, Indian Institute of Science, Bangalore, (Chemical Sciences); Dr J.N. Goswami, Physical Research Laboratory, Ahmedabad (Earth, Atmospheric, Ocean and Planetary Sciences); Dr G. Sundararajan, Defence Metallurgical Research Laboratory, Hyderabad, (Engineering Sciences). The other awardees are Dr N. Mohan Kumar, Tata Institute of Fundamental Research, Bombay (Mathematical Sciences); Dr K.B. Sainis, Bhabha Atomic Research Centre, Bombay and Dr Y.D. Sharma, All India Institute of Medical Sciences, New Delhi (Medical Science); and Dr Ashoke Sen, Tata Institute of Fundamental Research, Bombay and

Dr A.K. Raychaudhury, Indian Institute of Science, Bangalore, (Physical Sciences).

Instituted by the Council of Scientific and Industrial Research (CSIR) in 1957, each award carries Rs one lakh, a citation and a plaque. The awards were presented to the scientists by the Minister of Science and Technology, Mr Bhuvnesh Chaturvedi in New Delhi.

The Minister also presented to three young scientists the CSIR Young Scientists Awards for 1994. The awardees are Dr Sujjit Roy of the Indian Institute of Chemical Biology, Hyderabad, Dr Sridhar D. Iyer of the National Institute of Oceanography, Goa and Dr Debtosh Kundu of the Central Glass and Ceramic Research Institute, Calcutta.

Each award carries a citation, a plaque and Rs 10,000.

Engineering College at Jammu

The Governor of Jammu & Kashmir, Gen K.V. Krishna Rao (Retd), inaugurated Jammu's first engineering college at an impressive ceremony at Jammu recently.

Named Government College of Engineering and Technology, it is at present housed in a building of Jammu University on the old campus.

The Governor said with the opening of this college, the longstanding legitimate demand of the people of Jammu had been fulfilled.

He said the government had decided to utilise the existing buildings of Jammu University and set up new workshops and laboratories to start this college without any loss of time. He had already given instructions to set up a proper campus for the Jammu engineering college for which he assured adequate funds.

Advising the newly admitted students to benefit from the facilities created in the college, General Rao said it was not the building and equipment which made an institution prestigious but the excellence and hard work of its students.

CSIR Award for Business Development

The first ever Council for Scientific and Industrial Research (CSIR) prize for Business Development and Technology Marketing Achievement has been awarded to Dr A V Rama Rao, Director and Mr. T. Krishna Reddy, Deputy Director, marketing and liaison division of the Indian Institute of Chemical Technology (IICT).

The prize includes a plaque, a citation and a cash award of Rs one lakh.

The award, introduced this year in addition to the prestigious CSIR Technology Awards which were instituted in 1990 for inhouse recognition of merit, is given to the individuals or groups for outstanding contributions for promoting technology transfer and market development of the institute's knowhow.

The award is instituted as an incentive to laboratories for evolving an aggressive marketing profile and innovative strategies in tune with the new policies in the country.

The awardees' achievement of earning nearly Rs. 4.5 crore in 1993-94 for IICT contributes to more than one-third of the entire CSIR's earning from private industry during this year.

Dr Rama Rao, it may be noted, has also won the Third World Network of Scientific Organisations' prize for Technology in 1993 and the National Goyal Prize for Applied Sciences this year.

UNEP Award for Swaminathan

This year's United Nations Environment Programme (UNEP) Sasakawa Environment prize has been awarded to eminent agricultural scientist Dr M.S. Swaminathan and US scientists Paul and Anne Ehrlich.

Dr Swaminathan, Director of the Centre for Research on Sustainable Agriculture and Rural Development in Madras, was honoured for his efforts over 40 years in the conservation of biological diversity.

As one of the world's leading agricultural scientists, he has played a catalytic role in India's green revolution and in agricultural research and development, UNEP said.

His research on the conservation of wild relatives of the potato, wheat and rice led to India developing a strong national food security system.

Dr Paul and Anne Ehrlich, a couple based at Stanford University in California, have been leading authorities on the issue of population and the environment.

Since the late 1960s, they had warned of the looming problems of population growth and its effect on the environment. UNEP noted that the Ehrlichs have always stressed the devastating impact of over consumption in industrialised nations.

The prize, which is awarded annually, is worth $ 200,000.

News from Agricultural Universities

Togo President Visits HAU

The President of the Republic of Togo (West Africa), Gen Gnassingbe Eyadema visited Chaudhry Charan Singh Agricultural University here today. He was accompanied by an 18-member high level delegation.

Gen Eyadema visited the research farm where he was shown standing crops of millet, cotton, pulses and groundnut. He also went round the HAU Rural Antiques Museum, the Nehru Library and the College of Veterinary Sciences and the College of Animal Sciences.

He said since the agro-climatic conditions and natural resources of India and Togo were similar, the technology developed by the university could be easily applied in his country. He told the Vice Chancellor, Dr. S. Arya, that he was highly impressed by the research work. He also evinced interest in the packages of agricultural practices devised by the university scientists.

Dr Arya presented a Haryanvi doll and a replica of a Krishna chariot to the visiting President and his wife.

World Bank Aid for TNAU

The World Bank is reported to have come forward to help the Tamil Nadu Agricultural University (TNAU) computerise the libraries in its various colleges at a cost of Rs two crore and to provide Rs one crore for its advanced horticultural centres to promote vegetable production. This was revealed by Dr. S. Sankaran Vice Chancellor, TNAU.

Though India stood third in the world in vegetable and fruit production, the processing capacity was only one per cent against Brazil's 60 per cent and the Netherland's 70 per cent.

Every year, Rs 4000 crore worth of fruits and vegetables were getting spoiled for want of proper storage and transportation facilities, he said.

The Tamil Nadu Government was keen on promoting agri-business in different regions of the state and university would extend technological support for that, Dr. Sankaran added.

News from UGC

Southern Regional Office

The southern regional office of the University Grants Commission was inaugurated by Andhra Pradesh Chief Minister K. Vijaya Bhaskara Reddy on 28 September at Hyderabad. Speaking on the occasion Mr Reddy said that the contents of education needed to be restructured to suit the present day requirements. The decentralised U.G.C. setup, he felt, would ensure qualitative improvement in higher education. The southern regional office will have 57 universities and about 800 colleges in Andhra Pradesh, Tamilnadu, Kerala, Karnataka, Pondicherry and Orissa States under its jurisdiction.

The Andhra Pradesh Minister for Higher Education, Mr. A. Dharma Rao, who presided, emphasised the need for upgradation of the standards in higher education. The Minister for Primary and Secondary Education, Mr. P.V. Ranga Rao, suggested that the UGC should evolve a scheme to ensure recognition of the universities at the time of their formation. He said proposals for setting up new universities should be thoroughly scrutinised.

The UGC Chairman, in his welcome address, said besides the southern regional office at Hyderabad, four other regional offices are proposed to be set up at Guwahati (eastern), Bhopal (central), Pune (western) and Ghaziabad (northern region). These regional offices are expected to help decentralise the commission's functioning for effective monitoring and to ensure greater participation of the academics in the programme.

The opening of the regional offices comes in the wake of the administrative restructuring undertaken by the Commission on the lines suggested by the Hyderabad-based Administrative Staff College of India (ASCI) commissioned by the UGC earlier.

The regional offices will initially deal with the College Improvement Programmes in science (COPIS), humanities and social sciences, college general development programme, minor research projects and college development council besides overseeing seminars and symposia.

The release of grants to the autonomous colleges will also be looked after by the regional offices even while the UGC headquarters will continue to monitor their overall operations.

The proposals received from the colleges will be examined with the help of the expert committees and grants released to the institutions as per the guidelines prescribed under the schemes.

All the proposals of the colleges that were received by the commission's headquarters during the Eighth Plan period commencing from April 1, 1992 will be transferred to the regional offices.

The interregnum will be utilised to set up the office and other basic infrastructural facilities.

Accreditation and Assessment Council

An Accreditation and Assessment Council has recently been established in Bangalore. This was disclosed by Prof. G. Ram Reddy, Chairman of the UGC.

He said this was done as the standards varied from university to university and from college to college and no one knew how good each one was. The council was set up as part of the New Education Policy. "This is an independent body, even from the UGC, as far as its functioning is concerned," he remarked.

While clarifying that it was voluntary on the part of educational institutions to obtain accreditation certificates from the council, Prof. Ram Reddy did not rule out the chances of making it compulsory in the future.

The council, which would be headed by a part-time honorary chairman and full-time director, whose rank would be equivalent to that of a vice chancellor, would also have a general council and governing body. At present, he himself was officiating as the Chairman and the board would be constituted soon, Prof Ram Reddy added.

Countrywide Classroom Programme

Between 22nd October to 7th November, 1994, the following schedule of telecast on higher education through INSAT-ID under the auspices of the University Grants Commission will be observed. The programme is presented in two sets of one hour duration each every day from 6.00 a.m. to 7.00 a.m. and 1.00 p.m. to 2.00 p.m. The programme is available on the TV Network throughout the country.

Ist Transmission

6.00 a.m. to 7.00 a.m.

22.10.94

"Conjecture and Proof in Mathematics – Part I"

"Budget"

"A Search for Young Theatre Talents"

23.10.94

"Sowing"

"A Window into the Francophone World"

"The Week Ahead"

25.10.94

"Solar Cooker"

"Inside the Lung Bronchoscopy"

"Physical Properties of Minerals"

27.10.94

"Aluminium – Part IV"

"Teaching as a Career"

"Hygiene Plus Disease Minus"

29.10.94

"Conjecture and Proof in Mathematics – Part II"

"Shock of Survival"

30.10.94

"Question Forum"

"Medical Geography"

"The Week Ahead"

1.11.94

"Perspective in Physics"

"Prehistoric Site at Arangapur"

"Application of Plant Tissue Culture"

3.11.94

"Water Chemistry in Thermal Power Station – Part I"

"Introduction to Anthropology – Part I"

"Abhinaya – Histrionics of Dance"

5.11.94

"Culture of Ancient Cities : The Civilisation of Souzhou"

"A New World Order"

6.11.94

"Bookfare"

"Kerala Theatre Scene"

"The Week Ahead"

IInd Transmission

1.00 p.m. to 2.00 p.m.

22.10.94

"Programme on Management"

"Art During Renaissance"

"The Week Ahead"

23.10.94

No Telecast

24.10.94

"The Electromagnetic Spectrum"

"The New Economic Policy"

"Beyond Green Pastures : A World of Rural Non-farm Sector - Part II"

"Plasmid DNA Purification"

25.10.94

"Evolution of Money"

"Handicrafts – Toil, Tool and Talent"

"Biological Heart Valves"

26.10.94

"Evolution of Manufacturing"

"Sculptural Heritage of Kanchipuram"

"Health Communication : Obesity"

27.10.94

"Wasteland"

"A Pet with a Difference"

"Arms and the Man – Part II"

28.10.94

"Question Forum"

"The Girl Child - From Pity to Power – Part II"

"Radiation and its Applications"

29.10.94

"Programme on Management"

"Sports Acrobatics"

"The Week Ahead"

30.10.94

No Telecast

31.10.94

"Interview with the Bhat-nagar Awardee Dr. Rajaiah Simon"

"Application of Total Quality Management Concepts : Indian and British Experiences"

1.11.94

"Clouds–Forms of Condensation"

"Psychology of Prejudice"

"Dental Diseases"

2.11.94

"Exploitation of Wind Energy – Part I"

"The Abri Pataud : 1500 Years Under the Cliffs of Eyzies"

"Energy Flow"

3.11.94

"Optical Repeaters"

"Visit a Mineral Spring"

"Esperanto – An International Language"

4.11.94

"The Guitar Odyssey"

"Career Counselling : Performing Arts"

5.11.94

"Programme on Management"

"Bookfare"

"The Week Ahead"

6.11.94

No Telecast

7.11.94

"Economic Thoughts of Karl Marx – Part III"

"Current Affairs : Economics and Commerce – Part II"

"Yours Sincerely"

Hindi Telecast

प्रातः 6.00 से 6.30 बजे तक

24.10.94

"सितारों के नक्शे कदम को छूते हुए"

"शैवाल – एक जैविक उर्वरक"

26.10.94

"विविधता में एकता – शेषण के सपनों का भारत"

"ईंधन बचाइये"

28.10.94

"समझ सिनेमा की – भाग 16"

"चन्द चित्र बालिका के"

31.10.94

"देखो सूरज को गौर से"

"टाइटेनियम – अद्‌भुत धातु"

2.11.94

"अध्यापन के प्रतिमान – भाग 3"

4.11.94

"हिन्दुस्तानी जुवाने विदेश में – भाग I"

7.11.94

"बांसुरी एक अनोखा साज – भाग I"

News from Abroad

CASTME Awards 1994/95

Commonwealth Association of Science, Technology and Mathematics Educators (CASTME) Awards for Science, Technology and Mathematics Teachers are intended to encourage teaching of the social aspects of science, technology and mathematics, with particular reference to developing countries of the Commonwealth. The scope of the awards is interpreted broadly, and 'social aspects' includes the relevance of science, technology and mathematics curricula to local needs and conditions, and the impact of technology, industry and agriculture on the local community.

Teachers and officials (advisers, inspectors, etc.) working in primary, secondary and tertiary education in Commonwealth countries are eligible for the awards.

There are small money prizes

donated by CASTME. All prize-winners will receive twelve months free subscription of the *CASTME Journal.* The projects are judged on the basis of the following criteria:

* evidence of *originality* and *creativity,*

* evidence of *use in practice* and *cost effectiveness,*

* evidence of *evaluation* of the idea or material in use,

* evidence of *social relevance* of the project,

* standards of *presentation, organization* and *structure* of the report and

* overall impression of the project.

Only one project can be accepted from any one individual or syndicate. The project must be written or typed on A4 or quarto sheets of paper, and should not exceed 10,000 words in length. Photographs and other illustrative material should be included wherever relevant, together with any other evidence that shows the ideas have been effective in practice. Pupils' work may be included when possible.

Projects must be sent before 1 March 1995. For further details and entry form contact local British Council Office for details, or write to : CASTME Award Scheme, C/o Christine Bateman, Consultancy Group, Medlock St, Manchester, M15 4AA, UK.

MSc in Earth and Environmental Science Research Technologies

The Department of Geology at the University of Manchester will offer a new MSc course in Earth and Environmental Science Research Technologies. It is aimed at not only graduates of Earth Science, but also those who have studied other Physical Sciences such as Chemistry, Physics and Material Science.

The course aims to facilitate the development of basic skills for the design, implementation and analysis of geoscience investigations; including transferable skills such as computer data handling, management, evaluation and communication of results. It also aims to facilitate learning of fundamental research techniques and advanced knowledge in selected specialist areas of geoscience, as well as provide exposure to the practices of original research.

Further details can be obtained from Ms Angela Bogg, Geology Department, The University of Manchester, Manchester M13 9PL (UK).

GRADUATE SCHOOL OF BUSINESS & ADMINISTRATION
R-12/8, RAJ NAGAR, POST BOX 5,
GHAZIABAD
(Approved by All India Council for Technical Education, Govt. of India)

ADMISSION NOTICE

(SESSION 1995-96)

The Institute invites applications for admission to the following programme approved by **All India Council for Technical Education, Government of India, New Delhi**

POST-GRADUATE DIPLOMA IN BUSINESS & ADMINISTRATION (PGDBA) :
(2-YEAR-FULL-TIME PROGRAMME)

ELIGIBILITY : A Graduate in any discipline with minimum age of 19 years as on 1st August, 1995
HOW TO APPLY : The candidates are required to apply on the prescribed application proforma which can be had together with **Information Bulletin** at a cost of Rs 500/- from the office counter or by sending a Demand Draft for the amount in favour of **Graduate School of Business & Administration** payable at **Ghaziabad.**
SELECTION PROCEDURE : Selection will be made on the basis of merit determined by written test, group discussion and interview.
WRITTEN TEST Written test will be conducted at Delhi/Jaipur/Chandigarh/Lucknow/Calcutta/Bombay/Hyderabad/Guwahati on December 4, 1994
(The Institute reserves the right of cancelling any test centre or adding any more test centres.)
LAST DATE For Applying on the prescribed proforma is **November 13, 1994**
NOTE 1 Request for application form can be sent to the Registrar and completed application form can be Returned to Dr. L.A. Khan, Dean (Studies).
NOTE 2 . Limited hostel seats are available.
NOTE 3 For detailed information about the Institute, its programmes and other rules and regulations, refer to the Information Bulletin of the Institute

(RUSSI MODY)
CHAIRMAN, BOARD OF GOVERNORS

(DR. P.L. MAGGU)
EXECUTIVE DIRECTOR

BOOK REVIEW

Useful and Handy

Dalip Singh[*]

Anjana Chattopadhyay. Mauritius Today. New Delhi, Khama Publishers, 1994. Pp. 174. Rs. 240.

Mrs. Anjana Chattopadhyay, presently Assistant Librarian, JNU worked as Librarian and Foreign Technical Expert at Mahatma Gandhi Institute at Moka, Mauritius. She has painstakingly compiled a comprehensive information and reference book on Mauritius. Each chapter begins with a short introductory history, followed by historical facts, figures, statistical tables, graphs, photographs, etc on a given area of study

It is a short history of the determined efforts of the people of Mauritius to improve their quality of life by industrialization and modernization

This beautiful tiny island in the Indian Ocean has a very special bond and relationship with India, which started in 1834, with the migration of the Indian labourers to work in the sugarcane fields. At present two thirds of the population of Mauritius is of Indian origin.

Strategically located in the Indian Ocean, Mauritius has attracted the attention of almost all the big powers of the world The book methodically traces the importance of having good relations with Mauritius by all the major countries of the world.

The monograph also provides a lot of information on Mauritian flora and fauna. The author has listed the presence of some very rare and near extinct fauna of the country. She has given the preliminary information and thrown a challenge to the world environmentalists to conduct research in these hitherto unexplored fields. Round Island, which is thirteen miles north of Mauritius has two species of *boas*, which are not found anywhere else in the world

Before the first Dutch settlement, Mauritius was known as the "land of the birds". It had the now extinct *Dodo, Solitaire of Rodrigues* and the *Dutch Pigeon*. Out of the twenty two rare endemic species of birds, Mauritius is now left with nine species only. To save these rare birds, Mauritius has jointed the International Council of Birds Preservation, and the Jersey Wildlife Preservation Trust. These organizations have started "Captive Breeding Projects" to breed *Kestrel*, the rarest bird in the world.

This book is both for laymen and scholars: indeed for all those who want to know about Mauritius — its art, history, culture, economic resources and development. It is a very useful and handy book which should be on the shelves of all libraries and part of any scholarly collection of books by individuals, associations and learned bodies in India and abroad.

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[*] *Deputy Librarian, Jawaharlal Nehru University, New Delhi.*

GATE-95

INCLUSION OF PHARMACEUTICAL SCIENCES

This is to notify that the paper in Pharmaceutical Sciences (PY) will be included in GATE-95. This is an amendment to the earlier announcement of GATE-95 as published in most National dailies on October 2, 1994, and in the Hindu on October 9, 1994.

The candidates for PY must obtain the Information Brochure-cum-Application Form alongwith the supplement for PY by POST **only from GATE offices.** The other details and information remain as notified in the earlier announcement.

Organising Chairman, GATE-95

CURRENT DOCUMENTATION IN EDUCATION

A list of select articles culled from periodicals received in the AIU Library during September 1994

EDUCATIONAL PHILOSOPHY

Kulawiec, Edwin P. (1993). Stephen Leacock : The humourist as educator. **McGill J of Edn** 28(2), 303-12.

Rao, K N. (1994). Malaviya : A many sided genius. **Progressive Ednl Herald** 8(3), 45-9.

EDUCATIONAL PSYCHOLOGY

Barclay, James R. (1993). The regulative theory of temperament : Implications for assessment and teaching. **McGill J of Edn** 28(2), 181-212.

Vedhantha Chary, K. (1994). Insistence on the affective domain in education. **Progressive Ednl Herald** 8(3), 16-20.

EDUCATIONAL SOCIOLOGY

Alvarez, Benjamin. (1994) Assessing youth programs : An international perspective. **Comp Edn Rev** 38(2), 253-66

Dever, John T and Templin, Robert G. (1994). Assuming leadership : Community colleges, curriculum reform, and teaching. **Ednl Record** 75(1), 32-4.

Lyons, Christopher and Farrell, Mona. (1994). Teaching tolerance : Multicultural and anti-racist education. **McGill J of Edn** 29(1), 5-14.

EDUCATIONAL POLICY & PLANNING

Seeta Prabhu, K and Sarkar, P C. (1994). Measuring human development. **J of Ednl Plann and Admn** 8(1), 103-24.

WOMEN'S STUDIES

Juan, Ding. (1993). Present state of research in China's system of women's studies. **Chinese Edn and Society** 26(5), 85-98.

EDUCATIONAL ADMINISTRATION

Baluswamy, N and Narashiman, K. (1994). New vistas on university, research establishment and industries collaboration. **CURIE** 1(1), 20-3.

Coldstream, Patrick. (1994). Training minds for tomorrow : A shared responsibility. **Hr Edn Q** 48(3), 159-68.

Davis, James R. (1994). Integrating the quality triad : Curriculum, teaching, and assessment. **Ednl Record** 75(1), 42-6.

Hammons, James O and Nunn, Walter H. (1994). Criteria for establishing two-year colleges in the United States. **Hr Edn Rev** 26(3), 51-6.

Harman, Grant. (1994). Student selection and admission to higher education · Policies and practices in the Asian region. **Hr Edn** 27(3), 313-39

Prickett, Stephen. (1994). Enterprise in higher education: Nice work, or ivory tower versus exchange & mart? **Hr Edn Q** 48(3), 169-81.

Vizayakumar, K. (1994). Faculty recruitment in technical institutions : An objective framework. **Indian J of Tech Edn** 17(2), 5-9.

CURRICULUM

Weingartner, Rudolph H. (1994). Between cup & lip : Reconceptualizing education as students learning. **Ednl Record** 75(1), 13-9.

TEACHERS & TEACHING

Massy, William F and others. (1994). Departmental cultures and teaching quality : Overcoming "hollowed" collegiality. **Change** 26(4), 11-20.

Passi, B K and Malhotra, S P. (1994). Personalized teacher education program : A phenomenological study. **Progressive Ednl Herald** 8(3), 10-5.

Raghavachari, V P. (1994). Teacher organisations and professional development. **Progressive Ednl Herald** 8(3), 23-9.

EDUCATIONAL RESEARCH

Braxton, John M and Bayer, Alan E. (1994). Perceptions of research misconduct and an analysis of their correlates. **J of Hr Edn** 65(3), 351-72.

Fox, Mary Frank. (1994). Scientific misconduct and editorial and peer review processes. **J of Hr Edn** 65(3), 298-309.

Torrance, M and others (1994). The writing strategies of graduate research students in the social sciences. **Hr Edn** 27(3), 379-92.

EDUCATIONAL TECHNOLOGY

Camper, Elzar and others. (1994). Technology access and quality · The importance of public policy. **Ednl Record** 75(3), 47-52.

Chunjie, X and Yuxia, Z. (1994). Satellite television education in China : A project of teacher training through distance education. **Media and Tech for HRD** 6(2), 113-7

Jackson, Gregory A. (1994). Promoting civility on the academic network : Crime & punishment, or the golden rule? **Ednl Record** 75(3), 29-39.

Rama Rao, V. (1994). One-way video and two-way audio teleconferencing for distance learning. **Media and Tech for HRD** 6(2), 135-40.

EDUCATIONAL EVALUATION

Guozheng, Liao. (1993). Thoughts on the current college-university entrance examination and the general middle school graduation examination. **Chinese Edn and Society** 26(6), 83-95.

Mathews, Brian P. (1994). Assessing individual contributions: Experience of peer evaluation in major group projects. **British J of Ednl Tech** 25(1), 19-28.

Sile, Guo. (1993). The setting of questions in the college entrance examination and the objective of quality education in the middle schools. **Chinese Edn and Society** 26(6), 59-69.

ECONOMICS OF EDUCATION

Eisemon, Thomas Owen. (1994). World Bank lending for higher education and research : Lessons and implications for Eastern Europe, **McGill J of Edn** 29(1), 59-72.

Guskin, Alan E. (1994). Reducing student costs and enhancing student learning : The university challenge of the 1990s: Restructuring the administration : Part I. **Change** 26(4), 23-9.

Hoenack, Stephen A. (1994). Economics, organizations, and learning : Research directions for the economics of education. **Eco of Edn Rev** 13(2), 147-62.

Kitaev, Igor V. (1994). Russian education in transition · Transformation of labour market, attitudes of youth and changes in management of higher and lifelong education. **Oxford Rev of Edn** 20(1), 111-30.

Rajagopal, N R and others. (1994). Scientific and technical (S & T) manpower in India : An analysis of trends. **CURIE** 1(1), 24-35

SCIENCE EDUCATION

Fox, Mary Frank and Braxton, John M. (1994). Misconduct and social control in science : Issues, problems, solutions. **J of Hr Edn** 65(3), 373-83.

Sansanwal, D N and Suri, Sonia. (1994). Predicting achievement in organic chemistry of XI grade students studying through lecture method, programmed learning material and lecture with PLM. **Media and Tech for HRD** 6(2), 157-63.

LIBRARIES & BOOKS

Person, Ruth. (1994). Organizational structure at the crossroads. **Ednl Record** 75(3), 42-6.

ADULT EDUCATION

Gardiner, Jean and Taylor, Richard. (1993). University continuing education in Britain and the development of educational provision with the minority ethnic communities. **Adult Edn and Devp** 40, 63-70.

DISTANCE EDUCATION

Roy Choudhury, Namita. (1994). Distance education programmes : Its problems and promises. **Progress of Edn** 69(2), 37-9.

We Congratulate ...

1. Dr. Bhaulendra Singh who has been appointed Vice Chancellor of Purvanchal University, Jaunpur.

2. Dr. J.M. Waghmare who has assumed charge as Vice Chancellor of Swami Ramanand Teerth Marathwada University, Nanded.

3. Prof. R. Radhakrishna, who has joined as member-secretary of the Indian Council of Social Science Research (ICSSR), New Delhi.

UNIVERSITY NEWS

A Weekly Chronicle of Higher Education

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CLASSIFIED ADVERTISEMENTS

NORTH GUJARAT UNIVERSITY
PATAN

Applications are invited in the prescribed form alongwith details available from the office of the North Gujarat University, Rajmahel Road, Patan (N.G.) Dist. Mehsana-Gujarat between 11.00 a.m. and 2.30 p.m. on payment of Rs. 10/- in Cash or by a Crossed I.P.O. in favour of "Registrar" North Gujarat University, Patan for the following posts in the various Post-Graduate departments of the University so as to reach the under-signed on or **before 10th November, 1994.**

Sl No	*Post and Pay Scale*	*Subject*	*Number of Vacancies*
(1)	**Professor** (Rs. 4500-7300+other allowances as per University Rules) (Both posts reserved : One each for S.C. and S.T. candidates)	Chemistry Mathematics Total	1 1 2
(2)	**Reader** (Rs. 3700-5700+other allowances as per University Rules) (Three posts reserved : One each for S.T., S.C., and Socially & Educationally Backward Class candidates)	English Mathematics Sanskrit Total	1 1 1 3
(3)	**Lecturer** (Rs. 2200-4000+ other allowances as per University Rules) (Both posts reserved : One each for S.T. and Socially & Educationally Backward Class candidates)	Indian Culture Prakrit/Sanskrit Total	1 1 2

Note : Knowledge of Sanskrit preferred for Lecturers in Indian Culture and Prakrit.

Other conditions :

(1) Knowledge of Gujarati is essential.
(2) Candidates called for the interview will have to attend it at their own expenses.
(3) Those who applied earlier must apply again.
(4) Number of post(s) may be increased or decreased without notice.
(5) Number of posts in Reserved Category may be increased or decreased without notice. If candidates of Reserved Category are not available for the posts of Professors and Readers, other applicants may be considered for recruitment.
(6) The University reserves the right not to fill up post(s) advertised.
(7) Application received on plain paper or after last date shall not be entertained.

Date : 3-10-94
Place : Patan

B.N. Shah
REGISTRAR

THE UNIVERSITY OF BURDWAN

Advertisement No. 10/94-95
dated 7.10.1994

Applications in the prescribed form are invited for the following Part-time teaching posts with usual monthly honorarium plus conveyance allowances as admissible under rules of the University (A) English — One post, (B) Commerce — One post, (C) Business Administration — Four posts, (D) Diploma in Computer Application — One post, (E) Physics — One post.

Minimum Qualification - As prescribed by the UGC

Specialisation or Proficiency : For (A) American Literature/Milton; For (B) Research Methodology (for M.Phil level), For (C) Marketing/Personnel (Law)/General/Operations, For (D) Business Data Processing, System Software and Management Information System, For (E) X-ray & Crystallography.

Prescribed application forms may be obtained from Rajbati Office on and from 7.11.94 personally on payment of Rs. 20/- in cash at the UniversitySales Counter from 11 a.m. to 1.30 p.m. on working days (except 2nd and 4th Saturday) or by sending a self-addressed stamped Rs. 2/- envelope (11" x 9") accompanied by Crossed I.P.O. of Rs. 20/- drawn in favour of the Finance Officer, University of Burdwan. Last date for submission of applications to the Registrar with the requisite fee of Rs. 25/- payable in the manner indicated above is 30th November, 1994.

REGISTRAR

AWADHESH PRATAP SINGH VISHWAVIDYALAYA
REWA (MP)

No. Karmik/1994/1099

Dated : 3 Oct. 1994

ADVERTISEMENT

Applications are invited from eligible candidates in the prescribed form together with copies of certificates with an application fee of Rs. 30/- (Rs. 10/- for candidates belonging to SC/ST category) so as to reach Registrar, Awadhesh Pratap Singh Vishwavidyalaya, Rewa-486003 (M.P.) on or before 7-11-1994 for the following posts :

S No	*Name of the Post*	*Pay Scale*	*No of post*	*Classification/ Reservation of post*	*Specialization of post if any/ Remarks*
1	2	3	4	5	6
1	Dean, College Development Council	4500-7300	1	-	
2.	Director, Adult and Continuing Education	4500-7300	1	-	
3.	Director, J.N Centre for Policy Research	4500-7300	1	-	
4	**READER**	3700-5700			
	1. Computer Science		1	-	
	2 Ancient Indian History Culture and Archaeology.		1	-	1. Socio-Economic History 2. Preference will be given to those having sound knowledge of Numismatics and Indian Art.
	3 Psychology		1	-	Personality.
	4. Environmental Biology		1		1 Environmental Microbiology 2 Forest Ecology.
5	System Incharge Computer Centre	3700-5700	1	-	
6	Senior Scientific Officer, University Science and Instrumentation Centre	3700-5700	1	-	
7	Assistant Director, J.N. Centre for Policy Research.	3700-5700	1	-	
8	Deputy Librarian	3700-5700	1	-	
9	Lecturer	2200-4000			
	i. Environmental Biology		1	SC	
	ii Physics		1	G	
	iii. Chemistry		1	G	
	iv. Business Economics		1	ST	
	v. Mathematics and Statistics		1	OBC	
	vi. Russian Language		1	G	
10.	Scientific Officer University Science and Instrumentation Centre	2200-4000	1		
11.	Electronic Engineer, Vikram Space Physics Centre	2200-4000	1		
12.	Research Officer, J.N. Centre for Policy Research	2200-4000	2		
13.	Senior Technical Assistant Chemistry	2000-3500	1		

2. The minimum qualifications and the scale of pay of these posts are as prescribed by the University Grants Commission, New Delhi/State Government from time to time. The minimum and the additional/desirable qualifications prescribed for the posts will be circulated by way of a handout to the candidates concerned alongwith application forms The posts carry other allowances as admissible under University rules from time to time.

3. The University reserves the right to change the nature and/or number of posts advertised to abolish any or all of them without assigning any reason thereof.

4. Those already in service must apply through proper channel

5 No TA/DA will be paid to the candidates called for interview.

6. Usual reservation exists for SC/ST/OBC candidates

7. Prescribed forms of applications can be had in person from the Registrar's Office (Karmik Section) on any working day on payment of Rs 10/- in cash or by crossed Demand Draft drawn in favour of Registrar, A.P.S. Vishwavidyalaya, Rewa. Application forms can also be obtained by post on payment of prescribed cost alongwith a self addressed envelop size 23x10 cms with postage stamps worth Rs 10/-.

Applications received after the due date would not be entertained.

REGISTRAR

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Applications on plain paper giving full details of name, father's/husband's name, address, date of birth, educational and professional qualifications, experience, whether belonging to S/C, S/T or OBC etc, its supporting documentary evidence, are invited for one post of **SENIOR PROJECTIONIST** in the scale of pay Rs. 1250-30-1440-40-1800-EB-50-2200.

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Qualifications

(i) **Essential** (a) Matriculation or equivalent examination
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(ii) **Desirable :** Five years experience of projection work in a Cinema/auditorium or a Museum of repute.

The application alongwith photo copies of certificates and passport size photograph should reach the undersigned **within 15 days** from the date of publication of this advertisement. Person already in service should apply through proper channel. The crucial date for determining the age limit shall be the closing date for receipt of application. Convassing in any way will disqualify a candidate. Persons who have applied in response to earlier advertisement, need not apply again.

S.R.K. Gupta
REGISTRAR

— davp 1151(5)94

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